THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. CXII. No. 2476.] LONDON, OCTOBER 25, 1910. [62ND YEAR. PRICE 6d.

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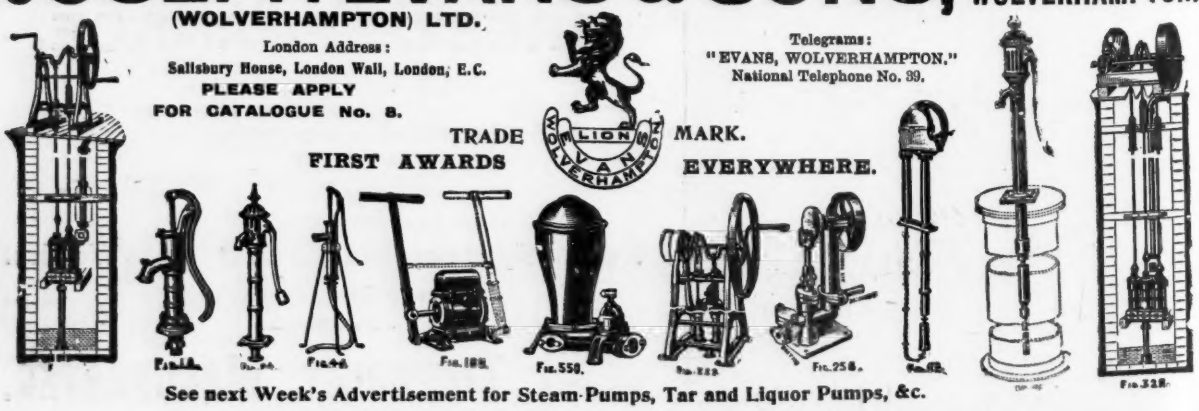

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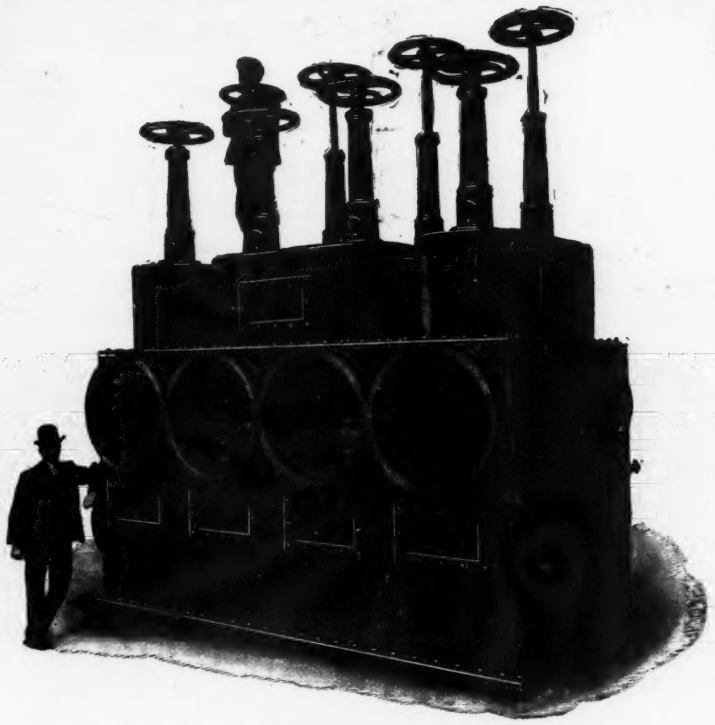

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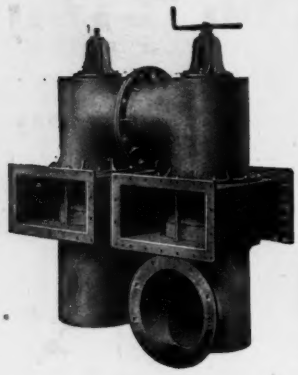

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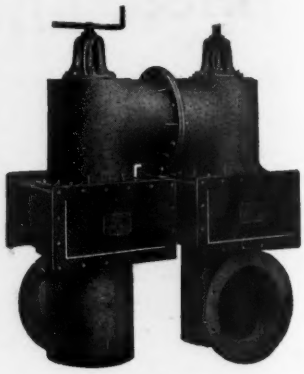

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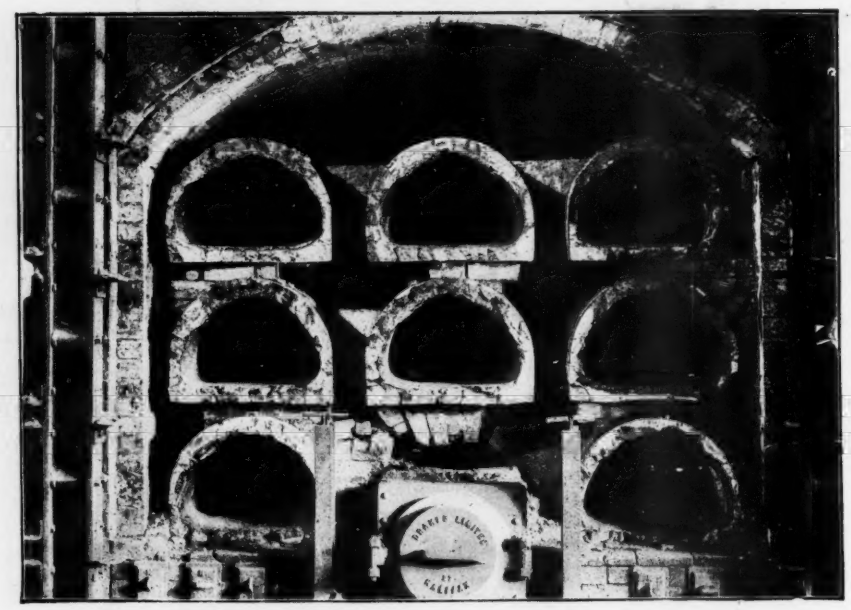

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Are the ACME of
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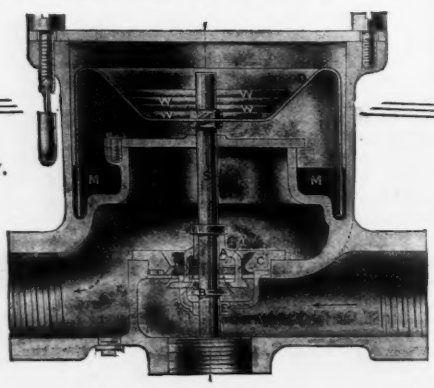

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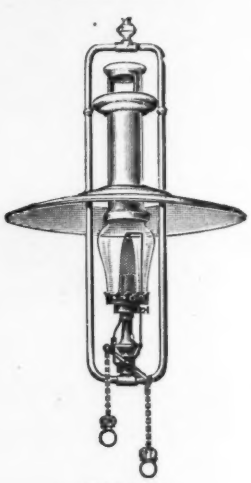

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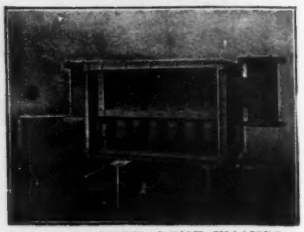

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THE "EZOL" INVERTED LAMP

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THE MOST ECONOMICAL LAMP EXTANT.

Wind, Rain, and Dust Proof.
Perfect Combustion.
Steady Brilliance.

125
C.P. PER BURNER
FOR GAS CONSUMPTION
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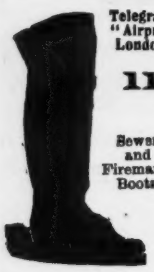

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Largest Manufacturers of Gas Main Bags.

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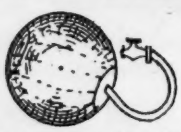

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Oilskin Clothing, Diving and Wading Dresses, Sewer Boots, Tar Hose, Stokers' Mitts, Bellows, &c.

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Workmanship and Materials of the Highest Quality.

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55 Candles for a consumption of **2¼ cubic feet** of Gas per Hour.

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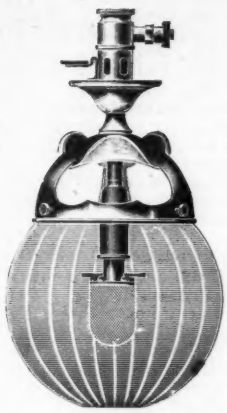

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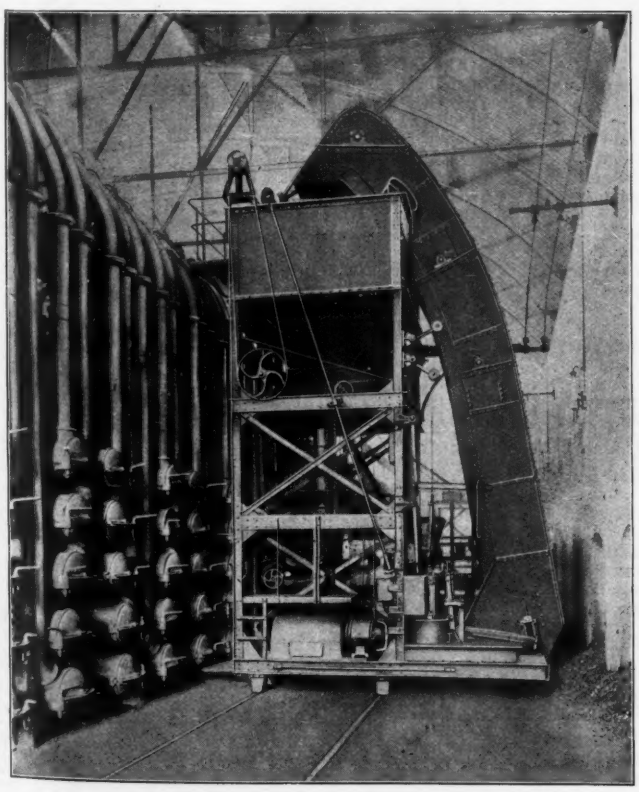

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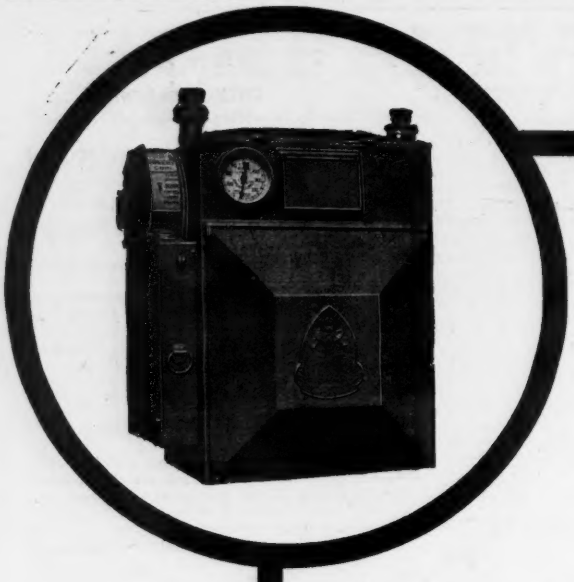

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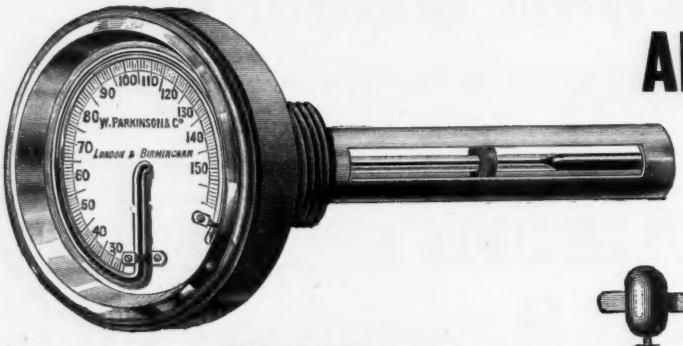

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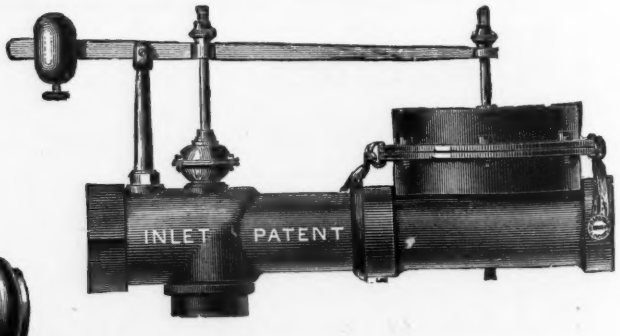

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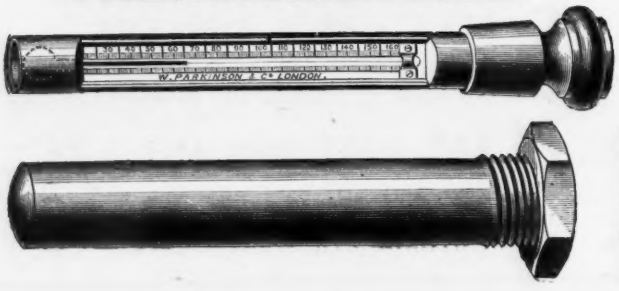

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JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

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VOL. CXII., No. 2476.—TUESDAY, OCTOBER 25, 1910.

EDITORIAL NOTES—GAS, &c.

Novel and Other Provisions in Gas Legislation.

To the followers of the legislative record published in our pages relating to gas supply, it will have been observed that certain clauses that appear session after session in the promoted measures seem to have reached the unalterable status that is proverbially attributed to the laws of the Medes and Persians. This is due to the form of clause being dignified by the approval of the parliamentary authorities, and its installation in the Model Clauses, after which there is no particular fear that the clause when inserted in a Bill will not go through. The authorities dealing with Private Bill Legislation are very jealous of interference with the forms of clause to which they have given their sanction; and some very good reason has to be presented before they will allow any departure therefrom. But at the same time, they do not shut eyes and ears to special considerations advanced in favour of change; otherwise the Model Clauses to-day would not have contained, *exempli gratiâ*, the new auction clauses and existing illuminating power and testing clauses. Some changes from stereotyped clauses are noticed in the review in our columns this week of the Scotch gas legislation for the session; and, without pronouncing any fixed opinion in regard to them, it may be suggested as being worth the while of promoters to devote a little consideration to them, with the view of seeing whether they are suitable for adoption, in their own particular circumstances, in future.

The first change that will be noted is in the provision as to a reserve fund in the Falkirk Corporation measure. Under the old legislation of 1847, maximum price gas companies were, and are, allowed to form "reserved" funds up to one-tenth of their nominal capital, or up to any other sum prescribed in their Special Act, from profits in excess of the prescribed maximum rate of dividend. In the case of sliding-scale companies, as is also well known, they are allowed to form a reserve fund to an unlimited extent, but only out of divisible profits applicable to the payment of dividend in (under the sliding-scale) excess of the standard rate. There is, by the way, no particular virtue in Parliament permitting gas companies to form a reserve fund up to any amount under such a condition. In the case of local authorities who desire a reserve fund in connection with their gas undertakings, practice varies; but, as a rule, there is some sort of identity with the terms of the 1847 Act as applying to maximum price companies. It is sometimes found that they are permitted to set aside from revenue such sums as they may think reasonable until a fund is accumulated equal to 10 per cent. of the aggregate capital expenditure for the time being; and in other Acts—such as the Egremont and Mallow this session—the fund is allowed to go up to one-fifth of the aggregate capital expenditure. We have Glasgow limited to a fund equal to 10 per cent. of the capital outstanding; and in their case the extent of the appropriation for the fund is also defined—at 10s. per cent. upon outstanding borrowings. Now in the Falkirk Order, we have—is it for the first time?—the basis of contribution to a reserve fund formed by the price of gas and the quantity of gas sold. When the price does not exceed 3s. 3d. for lighting purposes, not less than 2d. is to be taken per 1000 cubic feet sold for the purpose of the fund; when the price is 3s. 3d., but does not exceed 3s. 6d., the contribution is to be 1½d.; and when the price exceeds 3s. 6d., it is to be 1d. Fundamentally, this arrangement appears to be sound; for the greatest contributions should be made when times are good. When times are good in gas supply is when the price of gas for lighting purposes is lowest; and conversely when the price of gas is raised, it indicates those bad times against which the reserve fund has, in part purpose, been built up. This Falkirk reserve fund (which, by-the-by, is a compulsory one, seeing that the clause says "the Council "*shall*" for the purposes of the fund), in addition to the ordinary purposes to which such a fund may be applied, may be used for defraying the costs of extensions, but is not to be applicable to the cost of renewing meters and stoves.

The question of depreciation on gas-works plant and appliances is associated with the general one of the disposal of the gas profits in the case of the Glasgow Gas Consolidation Act. It will be remembered that the Corporation are prohibited from appropriating any of their gas profits in relief of the rates. The Gas Department are not at all sorry that this is so; and when the low-price gaseous fuel supply of the city renders the atmosphere less murky, and more sunshine is thus permitted to penetrate to the general environment of the citizens, they, too, will have good cause to be grateful to the wisdom of Parliament in this matter. But in the clauses stating how the revenues of the department are to be disposed of, it will be observed that the Corporation have had defined for them the amounts that they may set apart as depreciation upon the various assets of the department as calculated on the book values at May 31, 1906, together with the subsequent net additions to the assets. The rates allowed for depreciation are these: On gas-works, 1½ per cent. per annum; on chemical works, 3 per cent.; on pipes, 2 per cent.; on meters, 6 per cent.; on stoves, 10 per cent.; on premium, 2½ per cent. The allowances for the gas and chemical works certainly do not err on the side of liberality; but this prescription of fixed amounts for depreciation on various assets is not by any means the least important and interesting novelty in the session's gas legislation. It should be mentioned that, after meeting all ordinary expenditure, and making provision for reserve and depreciation, any balance remaining in any year is to be carried forward to the revenue account for the next succeeding year; and as soon as there is an amount sufficient for the purpose, it is to be applied to the reduction of the gas charges equally throughout the limits of supply. This is as things should be in the case of a municipal undertaking, with the qualification that any financial aid from the rates at any time should be a debt to be discharged.

Another matter that receives prominence in the Scotch measures reviewed this week is that of differential prices for gas supply. There has been a change—more compulsory than voluntary—in policy and view in this connection. Flat-rates for gas could, at one time of day, be defended by the fact of an undisputed possession; but it is not the case to-day. There is a scramble for business in lighting, heating, and power between a number of very keen competitors; and prices, in each line of business, must be governed not by the policy of a past day, but by what the competitors of town gas—whether coal, suction and other producer gas, or electricity—can, or do, offer. There are a few areas in which town gas is at such a price that probably a flat-rate suffices for all purposes. But this does not apply to very many supply districts; and so, in the majority of cases, each line of business has to be considered separately in relation to its own competitive conditions, unless the whole gas business, instead of expanding, is to shrink down to perhaps little more than the lighting business supplemented by a comparatively moderate use of cooking-stoves. This session, we have Glasgow, with its low price within the city of 2s. for lighting and 1s. 8d. for manufacturing purposes, obtaining from Parliament authority for charging a different price from lighting for all other purposes, provided that the rate charged for the gas supplied for any such purpose shall be the same under like circumstances to all persons. Outside the city supply area, differential rates for different purposes may also be charged, but on a higher scale than in the city area. The Falkirk Corporation have also secured authority to charge differential rates. These are the reflections of changed circumstances and of open competition, which claim greater liberty in trading condition.

Coal Economies in Gas-Works.

If we cannot induce Professor H. E. Armstrong to acknowledge that the gas industry has been, and is, doing something in the matter of the provident use of coal, it is hoped there will be better fortune with Mr. J. S. S. Brame, Lecturer on Fuel at the Sir John Cass Institute. In the report of the lecture by him published in our columns last week, on "Power Gas and its Development," there appeared these words: "Of course in some special industries, it would be "impracticable to economize in the use of coal for purposes "for which it was required. For instance, in gas-works "they must not expect any reduction in quantity, but rather "the reverse." We feel almost inclined to inflict a little censure on Mr. Brame for being somewhat behind the times in his knowledge in relation to the economies of gas production. It must be, of course, with such a progressive industry as that of gas supply, that the consumption of coal for carbonizing purposes will not show any substantial recession quantitatively, but already there has been a small one, which indicates that it has been found practicable in the gas industry to economize in the use of coal, and yet do a larger business than ever. It would indeed have been strange if the increased productions of gas per ton of coal carbonized—increased to the neighbourhood of 12,000 cubic feet—had not had some effect in this direction.

In the last-issued Board of Trade returns, the statistics of 19 more statutory gas undertakings—790 against 771—were included than in the preceding year; and, notwithstanding that these 19 gas undertakings threw the weight of the coal they carbonized on to the year represented by the last-issued returns, that year showed that (the total quantity of coal used being 15,394,307 tons for the statutory concerns) 12,446 tons of coal *less* were carbonized; but the make of gas from the smaller consumption of coal for the year—168,289,876,000 cubic feet—was 63,066,000 cubic feet *more*. If the last-published accounts of the Gaslight and Coke Company, the South Metropolitan Company, and numerous other undertakings are studied in comparison with those of five years ago, Mr. Brame will find something that will surprise him even more than the figures now quoted for the whole of the undertakings working under statutory powers in respect of the relations between coal consumption and gas production. Reverting to the returns for the whole of the statutory concerns, to show the further economy of the industry in the use of coal (it is true the position of the oil market comes into play here), there was not only the quoted increased quantity of gas made from the smaller amount of coal used, but the residual coke was brought into service to a greater extent than in the year before, with the result that the 21,628,862,000 cubic feet of water gas made represented an advance in production during the year of no less than 1,368,979,000 cubic feet. In the result, we have this significant fact that the total quantity of coal and water gas made in the year of the last returns was 189,918,738,000 cubic feet, against 188,486,693,000 cubic feet the year before—a difference of 1,432,045,000 cubic feet—although a less quantity of coal was carbonized.

We think these few figures will show that economies in the use of coal in the gas industry have been found practicable; and that the gas industry has not neglected its opportunities in this respect. Of course, it cannot be expected that, with the growth of the removal of coal from the domestic grate to the gas-works retorts, the carbonization of coal for gas-supply purposes will show a continued diminution; but it will be found that there is an advancing economy in the use of coal in proportion to the gas produced and sold. If we mistake not, the current year and immediate future years will exhibit a progressive movement in this direction.

High-Pressure Gas in Public Lighting.

It was not long since that the occupiers of the palatial buildings lining Victoria Street, Westminster, were crying out for more light; and it must be confessed that Victoria Street, one of the arterial ways opening out to the Houses of Parliament and Westminster Abbey at the one end and to important railway termini at the other, had a perfect right to a more brilliant system of artificial lighting than that which had done duty for so long. It is wonderful what can be accomplished by approaching a problem in improvement with a broad mind and in an open spirit. There were those who at one time said, there were those who hoped, that the days of gas were numbered so far as the lighting of the principal thoroughfares of our cities and towns was concerned, and that gas must for ever renounce (in favour of flame arc lighting) all claim to public partiality—rightly or wrongly bestowed—for high-power sources of light in such situations. But the error has been demonstrated by the Gaslight and Coke Company in a manner without parallel, first in the City and now, as part of the high-pressure section of the Westminster lighting scheme, in Victoria Street, Westminster. The occupiers of that thoroughfare, with illumination almost the equal of daylight during the evening and night hours over pathways and road, would declare a partizanship if they said aught else than that they now possess one of the most generously illuminated thoroughfares in the Metropolis, and that conferred by 24 1800-candle power high-pressure inverted burner gas-lamps—the majority on standards on the pathway, and one on each central refuge at important crossings.

The street is the first to be lighted from gas distributed by the extensive high-pressure system in the West-end; and the completed installation will provide a spectacle in the West-end in high-pressure gas lighting that will be a veritable delight to the many and a torture to the few, and that a noisy few. It is a high degree of perfection in illumination that has been reached in the street, and that too by employing lamp standards rather than central aerial suspension, for the adoption of which, in Cheapside and Cannon Street, the City Fathers are still endeavouring to find some rational excuse, though the drawbacks are several and obvious. The street affords an excellent test under the worst conditions for any illuminating agent, whatever its character. It has to be self-reliant in the matter of distribution; for in the greater part of the thoroughfare there is practically no assistance in the matter of reflection from the drab surfaces of the high blocks of buildings, constituting in the main the borderings of the street. It is the antithesis to a street lined on either side with large shop windows and lightly painted façades. When the shops of Oxford Street are lighted up in the early evening, they render generous help in the general illuminating of the pathways and roadway to the flame arcs running centrally down the street; and when the shops are closed, the reflective power is still considerable. Replace these shop fronts by buildings such as one has in Victoria Street, and Oxford Street would then present the same doleful patchwork of illumination as was witnessed at one end of the former thoroughfare when the Jandus flame arcs were put up as an experiment, and were promptly removed when gas was victorious in securing the lighting contract for the extensive part of Westminster that was open to competition. The principal of a well-known emporium in Holborn was saying the other day, in advocating the electric light for Holborn at a meeting of the Holborn Borough Council (*ante*, p. 208), that just as it was true that trade followed the flag, so it was true that trade followed light. The education of this gentleman as to the power of gas for producing light, as must be also that of the shopkeepers of Regent Street who petitioned the Westminster City Council some time since to retain electricity and not adopt gas, is deficient. It can readily be improved by making an evening trip to Victoria Street and to other quarters of the West-end recently mentioned in the "Journal." As we have said before, we say again that the character of gas lighting that will be seen in several districts in London this winter far surpasses anything that has ever been seen in those areas before.

Promotions and Public Ignorance.

We are sorry to see the recrudescence of the promotion of gas undertakings that are palpably over-capitalized; the East Hants Company being the latest in this new group, which, together, form a masterpiece in small gas company flotation. It is with surprise, not unmingled with regret on our part, that it is learned from two distinctly separate sources that the capital asked for by the East Hants Company promoters was more than over-subscribed. This means that the Company will have a present capital of £22,500, of which £14,000 in cash and £2500 in shares go into the pocket of the vendor, Mr. F. W. Talbot, who is believed to be the same Talbot who was identified at one time with the Laindon concern. Mr. Talbot may congratulate himself that the scheme has worked so well—for him, and that the public has swallowed so completely the inviting bait that was so deftly dangled before it. We should much like to see a valuation made by a gas engineer of recognized standing of what the Company have purchased from Mr. Talbot for the thousands of pounds named.

This £22,500 for the East Hants Company is not the

only capital that is going to be employed in connection with the supply of gas from the Company's works. The Liphook and Liss Gas Companies are formations all within the last few months; and they are the prospective purchasers of gas in bulk from the East Hants Company, estimated at a total of 12 million cubic feet, out of a calculated make of 20 millions. It is a case of wheels within wheels. The nominal capital of the Liphook Company is £5000, and of the Liss Company £10,000. We do not know the amount that these Companies succeeded in issuing. Let us suppose that between them they have a capital of £7500. Adding this to the £22,500 of the East Hants Company, makes a total capital of £30,000, for a gas consumption estimated at 20 million cubic feet per annum, if it works out as traced in the prospectus. This represents the outrageous capital of £1500 per million cubic feet for a sale that has largely yet to be realized. There are not very many data available as to the actual total capital costs of small gas-works of modern construction to contrast with this. But a recent instance is that of the Fazakerley Gas-Works, designed for the Liverpool Corporation by Mr. Isaac Carr. These have a carbonizing capacity of 35 millions per annum, with the remaining plant equal to 60 millions, and the present capital expenditure is only £12,710, though the foundations, being quicksand, required special treatment. Let Mr. Alexander Ritchie, J.P., Mr. Edward H. Jellett, and Mr. Thomas Webb, the Mayor of Andover as Directors, and purchasers on behalf, of the East Hants Company, compare the capital and capacity of what they have acquired from Mr. Talbot with the Fazakerley condition of affairs. The Directors, we imagine, will find they will have all their work to do, with such a capital as they have built up over this little concern, to make any return, let alone a satisfactory one, for the shareholders, notwithstanding charges of 5s. and upwards per 1000 cubic feet, which is again a crippling price for obtaining consumers. When the First Garden City Gas-Works were started, with a capacity of only 6 millions (which soon had to be levelled-up to 20 millions, and we believe has since been raised to a higher productive level still), gas was supplied at 3s. 3d. per 1000 cubic feet for domestic purposes, and was early reduced to 3s., with prices ranging between 2s. and 3s. for power purposes. Contrast this with the East Hants, Liphook, and Liss Companies, which three promotions appear to be part of one scheme.

It is an almost unvarying experience, too, that these over-capitalized gas concerns are not advised by recognized gas engineers. In this East Hants case, the Engineer reporting on the project is Mr. C. Chambers Smith, a member of the Institution of Municipal and County Engineers. In the case of the Liss Gas Company, Mr. P. J. Jarvis, "C.E.," was the Engineer. He was for a time the Manager of the Petersfield Gas Company, the shareholders of which have nothing for which they are indebted to the promoters of the concern, except a wicked weight of capital. We are not prepared to defend Mr. Jarvis's title to the use of the appendix "C.E." Enough has been said. Mr. T. Ranson, who reported on the Liphook Gas Company, is not recognized as a gas engineer of our acquaintance. Not one of the names mentioned, so far as we can trace, stands on the roll of membership of the Institution of Gas Engineers. But their names are printed in black capitals at the foot of their report, and the public no doubt believe them to be men of some station in the gas-engineering world. So capitals are formed for such promotions on public ignorance.

An Income-Tax for Municipal Purposes.

Among the varied matters raised at the autumn meeting of the Association of Municipal Corporations, was the question of broadening the basis of local taxation; and in this connection reference was made to a local purposes income-tax. It seems that certain members of the Bradford City Council are among those who are dissatisfied with the present basis of municipal taxation; and one of them who, in committee, had proposed a resolution in favour of making representations to Parliament with a view to the adoption of the principle of rating on income for municipal purposes, quoted Berlin in support of his views. He said that in that city in 1904 (the latest year for which he could get particulars) practically half the rates were raised by means of such a tax; there being in addition taxes on land, trade occupations, and property sales. The tax was a graduated one, and took in incomes as low as £21. Another councillor, pointing out some of the anomalies of the system existing in this country, expressed the opinion that if it were possible to bring about some alteration by which the overburdened shopkeeper would be rated upon his income and not upon his plate-glass window, there would be reason to be grateful that the question had been raised. Whether, however, this gratitude would be universal is open to some doubt; for if tradespeople paid less under the new system, some other persons would clearly have to equalize matters by paying more.

The Public Lighting Question in Paddington.

It will be seen from the account of the proceedings at the last meeting of the Paddington Borough Council which appears elsewhere, that, as a last resource, the report of the Works Committee has been again referred back to them, because it has been discovered that there is an old Standing Order to the effect that such references should go to the General Purposes Committee. It was also resolved that prices should be obtained from the Metropolitan Electric Supply Company for lighting only a part of the district. The Company are unable to light 25 miles, because they have no mains in that portion of the borough, and would have to open the roads for the purpose. So much for their taunt against the Gaslight and Coke Company that they have to tear up the main roads to lay mains for high-pressure gas lighting. To lay their mains, the Electric Supply Company would have to incur a capital outlay of between £20,000 and £30,000, which would have to be entirely found by the Borough Council in the lighting bill; while the Gas Company have their mains in every street. Attention may be specially directed to the cool request of the Electric Supply Company that they may send in a "sealed tender" to be considered at the same meeting as that of the Gas Company, in spite of the fact that the latter Company's figures have been made public. The Chairman of the Works Committee (Mr. Elgood) very properly exposed this suggested piece of unfairness.

The Meeting of the American Gas Institute.

According to the official notice of the fifth annual meeting of the American Gas Institute issued by the Secretary (Mr. A. B. Beadle), the proceedings were to be opened in the Auditorium of the United Engineering Societies' Building, New York, last Wednesday, and the meeting was to close with a steamboat excursion on Friday. The President is Mr. W. H. Bradley, Chief Engineer of the Consolidated Gas Company of New York. The following papers had been prepared for the meeting: "Lighting and Ventilation of Gas Appliance Display Rooms," by Mr. T. Scofield; "Manufacture of Balloon Gas in Water-Gas Apparatus," by Mr. G. H. Waring; "Pneumatic Caulking with Lead Wool of 30-Inch, 36-Inch, and 48-Inch Gas-Mains," by Mr. C. C. Simpson, jun.; "Cultivation of Friendly Relations between the Public and the Lighting Company," by Mr. W. J. Clark; "Construction of a Reinforced Concrete Tank for a Gasholder," by Mr. V. L. Elbert; "Brick, Concrete, and Steel Gasholder Tanks," by Mr. H. W. Aldrich; "The Laying of One 48-Inch and Two 36-Inch Gas-Mains under the Harlem River," by Mr. C. C. Simpson; "The Laying of a Pair of 30-Inch Cast-Iron Mains under the Passaic River," by Mr. A. H. Strecker; "Apparatus Designed for Remote Control of District Pressure," by Mr. J. S. Kennedy; "Pumps for Gas-Works Purposes," by Mr. H. L. Underhill; "Removal of Organic Sulphur from Gas," by Mr. H. M. Pabst; "Extraction of Cyanogen from Coal Gas at the Astoria Works," by Mr. M. E. Mueller; "Determination of Calorific Value and of Operating Conditions from Analysis of Industrial Cases," by Mr. J. M. Morehead; "Review of Recent Decisions of the Public Service Commissions which Affect Gas Companies," by Mr. A. E. Forstall; and "The Public Deceived by Faulty Data and Misleading Analysis of Data," by Dr. A. C. Humphreys.

Lighting of the West End.—The "Pall Mall Gazette" yesterday said: "The new system of lighting Victoria Street by high-pressure gas-lamps has now been completed; and the Westminster City Council are to be congratulated on the result. The many thousands of visitors to London who arrive at the Victoria Stations cannot fail to receive a favourable impression of the Metropolis if their first experience is to be driven along Victoria Street after dark—or rather after sun-down—for the new lamps, each of 2000-candle power, have entirely banished darkness from what was previously a rather gloomy thoroughfare. When the installation of modern gas-lamps has been completed in Regent Street, Pall Mall, Piccadilly Circus, and Shaftesbury Avenue, London will make a far better comparison with Berlin and Paris in the matter of street-lighting than ever before. Unfortunately, the Westminster City Council cannot extend their improvements to all their West End thoroughfares, as, owing to their hands being tied by a thirty years' contract, electric arc lamps will continue to be used in the district of St. George's, Hanover Square."

GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 282.)

MOVEMENTS in the chief departments of the Stock Exchange last week were fluctuating and irregular, according as various factors came into operation. Chief among these were the state of the Money Market, a feeling of relief when the Bank rate was fixed, the revolt of the boiler makers, and the rise in Americans and South Africans. Consols have been the principal sufferer. At the opening on Monday, things looked rather promising; the gilt-edged group, Railways, and the Foreign Market being firm, as well as many speculative lines. Tuesday was quieter and scarcely so strong, though there was no fall in prices to speak of. On Wednesday, business was on a reduced scale, and the tone was dull and heavy; money having much to do with it. Consols lost ⅛; Rails were dispirited, with shrinking prices; and most of the rest were a bit the worse. Thursday opened dull, and things dragged while awaiting the Bank's decision. When this became known, there was some recovery from the worst prices. A better tone was the feature of Friday, and even the usual realizing did not do much harm; but the speculative markets were in much better favour than the higher-class securities. On Saturday, the tendency was barely as good; but Government securities were all fairly steady. In the Money Market, rates for loans were at first easy, in the face of an abundant supply. Discount terms hardened, but were inclined to relax before the close. The Bank rate on Thursday was raised from 4 per cent. to 5 per cent. Business in the Gas Market was more active in the aggregate, and attention was more widely distributed among all groups of undertakings than in the week before. There were very few alterations in prices, but they were mostly easier—no doubt affected by the monetary conditions. In Gaslight and Coke issues, the ordinary was a sufferer to a mild extent, and closed at a fall of ½. Transactions ranged from 105¼ to 106. The secured issues were pretty busy, and were unaltered. The maximum was done at from 87¼ to 88, the preference at from 104½ to 105½, and the debenture at from 80½ to 81¼. South Metropolitan was moderately dealt in at about the same figures as the week before—121 to 122½. For the third week running, Commercial capital stocks were untouched; but there was one bargain in the debenture at 80. Among the Suburban and Provincial group, Alliance and Dublin changed hands at from 86¾ to 87⅝, British at from 44½ to 44¾, Brentford debenture at 99½, and South Suburban at from 120¼ to 120¾. In the Continental companies, Imperial was unchanged at exactly the same figures as the previous week—187 to 188½. Union was marked at from 96½ to 98, European fully-paid at from 23¾ to 24½ (a rise of ½), and ditto part-paid at from 17⅞ to 18 1/16. Among the undertakings of the remoter world, Ottoman realized 6 3/32, Primitiva 7 7/16 and 7 9/16, ditto preference from 5 7/32 to 5⅜ (a fall of 1/16), ditto debenture 98½, San Paulo 15⅝, and ditto debenture 51½.

ELECTRICITY SUPPLY MEMORANDA.

Are We Downhearted?—Bearing False Witness by Omission—Feelings of Sympathy—Taller Prices and Tall Talk—Assessment for Rating Purposes—Want of Parallel in Reduced Average Prices and Costs.

THESE notes are being written before the "Outdoor Lighting" issue of the "Electrical Times" is to hand; but there will be an opportunity found for dealing in another part of the "JOURNAL" with what is promised by "Meteor" to be a wonderful production. "Meteor" has our sincere sympathy. In the note announcing, a week beforehand, the marvel that was to be expected, we detect a deep sigh of relief that he and the staff of the paper have nearly got to the end of their self-imposed task. Writes our friend, "The labour has been considerable." Just so. What a depth of meaning there is in the quoted words. The difficulty of getting material; the midnight oil—pardon, electricity—that has been expended; the tormented brain in constructing a case for public lighting by electricity against what has happened lately in the successes of gas in competitive tendering. It can all be pictured from that one short confession—"The labour has been considerable." But never mind "Meteor." Think of the great reward that awaits in the vast hereafter—or shall we say "in the land flowing with milk and honey" as viewed from Mount Pisgah?—all altruistic souls such as you. But we do wish that you had not, prior to the confession, dropped into such altiloquence, or rather strained language, as is traceable in these lines: "The hysterical triumph over the thankless experiment [why "thankless?" and why "experiment?"] in Westminster should have been enough in itself to suggest that our competitors were not feeling cheerful at the prospect. Next week we propose [not "shall," but only "propose"] to explain the reason for their downheartedness, and to show that they are richly entitled to sympathy." Ah! "the labour has been considerable." But are we downhearted? The "considerable labour" surely upset "Meteor's" judgment.

In connection with this public lighting question, there are two things that we cannot get electrical people to notice. The first is that the "successes" of electricity in public lighting happen to be in the districts of municipal electricity suppliers who are also the lighting authority, and not in districts supplied by electricity companies unless they do a little bit of street lighting for the sake of any commercial advantage that it is considered arises from advertisement in this way; the other is, that price comparisons are made with gas lighting as it has been and not as it can be, using, at the same time, costs per unit for electricity at which the undertaking cannot possibly afford to supply private consumers for lighting, unless its managers want to hurry it into a state of absolute insolvency. There was an instance of this evasion of facts at the meeting of the Plymouth Borough Council the other day, when Mr. Anthony, the Chairman of the Electricity Committee, was talking about the annual report. Among his remarks was this one: "A great deal has been made of the fact that in Westminster electricity has been displaced by gas; but it is also true that only a portion of the district is lighted by gas." Has Mr. Anthony never heard about that singular piece of business known as the St. George's (Hanover Square) Vestry electric lighting contract? Has he never heard what Alderman Everitt said, in the Westminster City Council, only in April last, about that electric lighting contract? If not, here it is: "He wished to make it perfectly clear that he was absolutely in favour of gas, instead of electric lighting, for the streets. He was not always so, because electric lighting was introduced into the streets, by the St. George's Vestry, on his casting vote as Chairman. If the Gas Company had started to make improvements before, the streets of St. George's would never have been lighted by electricity. There was no comparison now between the two illuminants; gas was unquestionably the better and the cheaper." Then Mr. Anthony went on to say that "there were three other places where electricity had replaced gas—Marylebone, Shoreditch, and Hampstead. In the first-mentioned place, a saving of £2600 a year was estimated." Does Mr. Anthony know that these three places own the electricity supply? Does he know the prices per unit charged for public lighting, in comparison with the prices charged for private lighting? Does he know that the statement as to the estimated saving is based on cut-prices for electricity on the one hand, and on the old prices for gas and old system of gas lighting on the other, and not on what the Gas Company can now offer—a large additional illuminating power by the new inverted gas-burners at a lower price than ever before? Does it not occur to him, too, that if the public lighting cannot be done at the price that is charged per unit to private consumers, and the gas-lamps then be kicked out of the field on the grounds of uneconomy and inefficiency, public lighting by electricity must be a poor recommendation to the private users of artificial illumination?

There is much more in this matter than Mr. Anthony and many other electrically-inspired chairmen of electricity committees can see or understand. It is patent from what is said above that Mr. Anthony's information badly wants supplementing. The Local Government Board can see a lot more than Mr. Anthony and others occupying similar positions. It is on the Board's suggestion that the governing body of Watford have instructed their Finance Committee to prepare a comparative statement, showing the present cost of lighting the streets by electricity, and the cost of lighting them by incandescent gas lighting. We are afraid the Board's Inspectors find rather common the experience that Mr. H. Ross Hooper had at Tonbridge the other day. He could not, at an inquiry held into an application for a loan for, *inter alia*, public lighting by electricity, ascertain whether or not the local Council had really given any consideration to the question as to whether a tangible saving was to be obtained for the ratepayers by making the change from gas lighting. All the reply he could get to his inquiries was the parrot-cry as to the Council patronizing their own shop. But Mr. Hooper was insistent concerning what would be the gain of the ratepayers by making the change; and he laid down the very serviceable rule of conduct for local authorities in connection with this subject, that "No change should be made in the system of lighting purely out of feelings of sympathy." There is a common-sense ring about that. If local authorities would always deal with this matter on a strictly business basis, the gas industry would not care. To the gas industry the commonplaces of competitive business are not the only issues; their strong objection is to the unfair uses made by municipal electrical possession to suppress the competition of private enterprise. It is asked that local authorities shall deal with the public lighting service upon an independent basis. But they will not, though, as pointed out last week, a certain writer in an electrical paper was expressing most pious horror at any local authority daring in these times, in the interests of ratepayers, to deal with the public lighting except on the open tender system. What about Hampstead and other authorities?

The metallic filament lamp has now been with the electricity supply industry a sufficient length of time for the managers of undertakings to have ascertained whether the revenue-reducing effect of the lamp can be compensated by increased business in other directions. This naturally largely depends on the character of the district. In many cases, it is being found that new business cannot be obtained to the equivalent of the loss due to the metallic filament lamp, which produces a loss not only in the sale of current, but, as many of the charges incurred in supplying consumers' premises do not diminish, in that connection also. In the case of some companies, it has been determined that the only thing to be done to maintain the profits is to raise the price per unit to be charged to consumers; in the case of local authorities, they have the alternative, which is not possessed by the companies, of forcibly extracting something out of the pockets of the ratepayers to compensate for the loss. The Metropolitan

Electric Supply Company, the Brompton and Kensington Company, and the Wakefield Electricity Department are examples of concerns that have quite recently increased their prices for current; while the Corporation of Kingston-on-Thames have put another ¼d. on the rates. Now tell us, Mr. "Electrician," which is the more moral course. It is truly grotesque to see the vast amount of sermonizing and gratuitous advice that certain of the electricity companies are getting who talk of raising, or who really do raise, their charges for current, while no protest goes forth from the same quarters when the ratepayers have burdens imposed on them year after year in the name of the electricity undertaking. We read in the "Electrician" that the objection to raising the price of electricity is that it "is particularly inopportune while the rivalry between electricity and gas is so keen." As bad as that is it? Then what comes of all the boast that electricity at 3d. to 6d. per unit is as cheap as gas-lighting by the new incandescent burners, that it is safer than gas lighting, that it prolongs life, and incarcerates doctors, house decorators, and washerwomen in workhouses and other asylums through their services not being required by the users of electricity for lighting purposes? The "Electrician" remarks that "the action of the two companies [named above] appears the more regrettable when attention is drawn to the charges for energy which are in force in the neighbouring districts. Thus, the Hammersmith Council supply current for lighting at 3d. per unit; and several instances of a supply being given at 3½d. per unit occur in the London area. When consumers and prospective consumers are aware of this fact, it will not be surprising if they should fail to appreciate the difference in the two cases." Perhaps consumers will not; but we take it the "Electrician" does, or, if it does not, perhaps it will explain a little more explicitly the nature of the reflection it intends to cast upon the managements of the Metropolitan and Brompton and Kensington Companies. It is gathered further that our contemporary does not consider the incandescent gas mantle occupies at all a strong position now. "Electric supply undertakers possess a strong weapon in the metal lamp with which to attack the *hitherto* strong position of the gas mantle." Why attack the gas mantle if its strength is of the past? Under such circumstances, there should be a "walk-over" for the metallic filament.

At one time, during the tenure by Mr. A. H. Seabrook of the engineership of the West Ham electricity undertaking, a great deal of noise came from that quarter. Noise always attracts attention in proportion to its strength; and much attention was directed to the marvels that were being wrought, according to official estimation, at West Ham. The electric light was going to turn the West Ham Gas-Works into a scene of desolation, as it was much cheaper than gas lighting. Deficits were being transformed into profits; but some meddling individuals pointed out that the undertaking was not meeting its due financial obligations —among other things, it was said an indulgent assessment authority was injuring other industries in the neighbourhood by letting the electricity concern go almost scot-free. Since Mr. Seabrook and his faithful henchmen migrated to Marylebone, and Mr. H. H. Couzens has been in charge at West Ham, there has been less braying of trumpets, and, among other things, the assessment of the concern has been adjusted, so as to place it on a (we assume) proper footing in relation to other industrial undertakings in the district. The result is that for the past year there is a deficiency of £2900, which has been met out of the reserve fund, and which leaves a balance to the credit of that fund of only £2081. But no less than £5200 of the increased expenditure for the year was accounted for by additional rates. This shows how the concern was formerly favoured. In the Seabrookian days, it was said that electric lighting at 3d. per unit for the current was cheaper than gas lighting; and there was such a stir in the West Ham Electricity Department over the boasted greater economy, that one could not help fancying the estimable Mr. Seabrook, Mr. Holmes, and others had visions of an early laying to waste of the West Ham Gas-Works. That was some time since. What are the current facts? Last year there was a total increase in the electricity output of West Ham of 3,634,344 units; but of this only 20,269 units (representing at 3d. per unit a revenue of merely £253) represent the increased consumption for private lighting. And the Treasurer reports that the net result of the operation of the sales department is a loss of £600! The great growth for power is already showing its effect upon the financial position. The average price obtained per unit over the entire output fell from 1·02d. to 0·93d.—a difference of 0·09d. But we see that the cost of production has only declined from 0·996d. to 0·93d. per unit—a difference of 0·066d. So that the decline per unit in the average price was 0·024d. greater than the reduction in expenses. It does not look as though increased business of this character is improving the financial position of the concern.

Outdoor Lighting by Gas and Electricity.—The issue of the "American Gaslight Journal" for the 10th inst. contains an article by Mr. Norton H. Humphrys, of Salisbury, on "Outdoor Lighting in England." In the course of it, he gives some figures showing the number of gas-lamps to one electric lamp in the following places: London (City), 3; Edinburgh, 9; Leith, 9; Perth, 11; Aberdeen, 20; Glasgow, 22; Dundee, 62; Liverpool, 122; Bradford, 141; and Manchester, 220. On the Continent, the number of gas-lamps to one electric lamp in the places named was as follows: Berlin, 4; Dusseldorf, 5; Munich, 9; Vienna, 19; Cologne, 25; Dresden, 25; and Brussels, 29.

PERSONAL.

We are pleased to find, from the published results of the recent examination for the final degree of LL.B. of the University of London, that Mr. C. E. Brackenbury, Barrister-at-Law, was successful in passing with honours.

Mr. W. Tomlinson, Manager of the Rochdale Water-Works, closes his official connection with the Water Department on the 31st inst., after forty years' service; Mr. F. H. Brunt, the new Manager, takes up his duties on the 1st prox.

Mr. Norman S. Mitchell, who was for some time employed in the gas-works of the Cockermouth Urban District Council, recently obtained an appointment at the Toronto Gas-Works, and he has now left England for Canada. Before starting, however, he was the recipient of a useful gift, in the shape of a Gillette safety razor, from the workmen and officials, as a mark of their esteem. The presentation was made by Mr. James Black, who, on behalf of the subscribers, wished Mr. Mitchell good health and prosperity in his new field of labour.

THE LATE MR. JOHN BIRCH PADDON.

The following appreciation of the late Mr. John Birch Paddon, whose death was noticed in the "Journal" last week, has been sent by a correspondent who says he will "ever be affectionately grateful to the deceased for many kindly considerations to a young and struggling fellow-workman."

Very few of those still working in the busy ranks of the gas world can recall the events in its history which were marked by the personality of the high-class and dignified professional gentleman who has just been laid with his fathers. Beyond a special ability as a mechanical and civil engineer, as proved by various inventions and originalities, Mr. Paddon was distinguishable by an unswerving consistency and loyalty to truth and high principle; so that quite early he became detached from the yeoman duty of his profession, and was picked out to join the boards of administration of a numerous collection of companies of which he had previously been Engineering Adviser. In these positions, he was greatly esteemed for his powerful grasp of policy and not less for his cheery friendliness and the old-world polish of a considerate manner, self-respecting and respect-compelling. To those admitted to his private friendship he ever extended a refined and generous, though unpretentious, hospitality.

Memory recalls how he pioneered the Brighton and Hove Gas Company's Bill for amalgamation (at that time a rare policy) through a crucial parliamentary contest, from which the Company emerged with a staggering reduction in its maximum price, and with other arduous restrictions. How, further, to the surprise of all, he worked through these hard conditions, and brought the United Company into a front rank position with good dividends. Many other successes of this sort marked his career; but he shone best in the genius of engineering construction which drove back the sea, and planted the substantial and enduring gas-works at Portslade on what had been a storm-wrought beach of sand and drift. His experience and knowledge of the modes of reinstating the sea defences and of procuring the accumulation of beach to protect the limits of the site were unique, and it is to be trusted are somewhere preserved for the guidance of coast protecting engineers at large. His faithful co-operator in this—Mr. Joseph Cash, M.Inst.C.E.—would render service to his profession if he could crystallize this special experience in a contribution of it to the annals of the engineering world.

Mr. Paddon's triangular ties to the girders at the heads of gasholder standards, his works in concrete tank building, his rotary scrubber-washers, which thirty-five years ago pioneered all modern examples of this principle, and notably the invention of the leather diaphragm regulator of forty years ago, are only some of the evidences of the constructive ability which attracted the admiration and respect of his professional friends, among whom the writer was always proud to be reckoned.

More Gas Publicity.—The Gaslight and Coke Company are continuing their highly effective advertisements in the Woman's Supplement to "The Times;" and evidence reaches us almost daily that other gas companies are equally impressed with the value of publicity. Reference was made last week to the South Metropolitan Company. Their neighbours, the South Suburban Company, are also to the front with advertisements occupying considerable spaces in prominent positions in the local newspapers. The "Reading Standard" for last Saturday contained the Gas Company's "Facts! not Fiction," advertisement to which attention was directed in the "Journal" last week. Upon the other side of the page is the Electric Supply Company's advertisement, also noticed. On Wednesday, the Sheffield Gas Company figured prominently in a page advertisement in the "Sheffield Daily Independent;" a view of a corner of one of their showrooms occupying the centre of the page. This is all very well; but, as already emphasized, something more is required. The gas industry must keep pace with, and even ahead of, the electricity industry in the matter of publicity.

QUALITY OF LONDON GAS.

THE results of the testings made of the gas supplied by the three Metropolitan Gas Companies in the area for which the London County Council is the controlling authority have now been published for the past quarter, and according to custom we have prepared a summary of them and of the similar figures for the corresponding quarters of 1908 and 1909. The period referred to as the third quarter of the present year is, in fact, the thirteen weeks ending on Oct. 1; and the quarterly periods taken for comparison are the thirteen weeks ending on Sept. 25, 1909, and Sept. 26, 1908.

ILLUMINATING POWER.

The average and minimum results obtained in the testings of illuminating power with the "Metropolitan" argand burner No. 2 are shown in Table I. The gas is required by Statute to have an illuminating power of 14 candles; but no forfeiture is incurred unless the deficiency amounts to half-a-candle or more; and, provided that it does not exceed one candle, the results obtained on any one day are averaged with those for the preceding and following day in computing the illuminating power for a day. In 1908 and 1909, however, the Gaslight and Coke Company (only) were required to supply gas of an illuminating power of 16 candles, instead of 14 candles as at present. It will be seen from the results given in Table I. that not only has the gas supplied by all the Companies been, on the average, well above the statutory requirements in respect of illuminating power, but also that the minimum results are such that there has been no question of any one of the Companies incurring a forfeiture. It is instructive to notice that the South Metropolitan Company have seen their way to making a distinct reduction in the average illuminating power of the coal gas which they supply, though the average is still 1·85 candles above the standard of 14 candles which is specified in their Acts. The other two Companies have been able to work closer to their standard, doubtless owing to the gas which they supply being a mixture of coal gas and water gas. But they have kept well above it on the average.

TABLE I.—*Testings of Illuminating Power (Argand) for Third Quarter of Year (Candles).*

Company.	Average.			Minimum.		
	1908.	1909.	1910.	1908.	1909.	1910.
Gaslight and Coke .	17·09	16·77	15·17	15·81	14·92	13·57
South Metropolitan.	16·79	16·23	15·85	14·96	14·16	14·15
Commercial . . .	15·36	14·71	14·79	14·03	13·38	14·06

The testings with a flat-flame burner for "information" only are not now made with the same regularity and frequency as in past years, and little more need be said in regard to them than that the averages of the results for the quarter were: For the Gaslight and Coke Company, 8·96 against 12·26 and 11·64 candles in the corresponding quarter of 1908 and 1909 respectively; for the South Metropolitan Company, 10·24 against 11·52 and 10·63 candles in 1908 and 1909; and for the Commercial Company, 8·71 against 9·78 and 8·83 candles in 1908 and 1909. It will be seen that the mixed gas of the Gaslight and Coke Company now develops less light in the prescribed flat-flame burner than the coal gas of the South Metropolitan Company relatively to the actual illuminating power of the gas, though when the former Company were working to a 16-candle standard, their gas gave superior results in the flat-flame burner. The difference between the average results with the argand and the flat-flame burner is now 6·21 candles for the Gaslight and Coke Company and only 5·61 candles for the South Metropolitan Company. Taking the corresponding quarters of 1908 and 1909 together, the flat-flame average was 4·98 candles below the argand average for the Gaslight and Coke Company, and 5·43 candles below for the South Metropolitan Company. It would thus appear that the values for flat-flame lighting of the supplies of these two Companies have been reversed relatively to one another in the course of the last twelve months or so. Owing to the irregularity of the flat-flame testings in the past quarter, however, it would be unwise to accept this conclusion as final.

CALORIFIC POWER.

The average and minimum results of the testings for calorific power are given in Table II. Their chief interest perhaps lies in the support which they afford to the view held by us, in common with many well-known gas engineers and experts, that the standard of calorific power of 125 calories net per cubic foot named in the Gaslight and Coke Company's Act, 1909, does not correspond with gas of an illuminating power of 14 candles. This Company supplied last quarter gas averaging 15·17 candles, yet the net calorific power averaged 122·4, and upon one occasion it was only 113·3 calories per cubic foot. Similarly, the Commercial Gas Company supplied gas averaging 14·79 candles and 122·8 calories net. If the Gaslight and Coke Company were to decide to supply gas closely conforming in respect of illuminating power to the quality which is required of them by Statute, it is obvious that the net calorific power of the gas would average about 117½ calories per cubic foot, and might fall on occasion,

TABLE II.—*Testings of Calorific Power for Third Quarter of Year.*

[The results are expressed, as in the London County Council reports, in "calories" per cubic foot, but may be converted into B.Th.U. by multiplying by 3·968.]

Company.	Average.			Minimum.		
	1908.	1909.	1910.	1908.	1909.	1910.
Gaslight and Coke, gross .	..	144·5	137·2	..	135·4	127·5
,, ,, net .	131·5	129·1	122·4	122·4	120·5	113·3
South Metropolitan, gross.	..	146·8	145·8	..	130·3	135 7
,, ,, net .	134·0	130·5	129·8	123·1	117·3	120·1
Commercial, gross . . .	..	140·5	137·6	..	130·1	125·7
,, net. . . .	127·5	125·5	122·8	117·6	116·7	112·4

in the ordinary course of manufacture, to (say) 108 calories. Now the Company are liable to incur a forfeiture if the net calorific power of the gas which they supply is ever less than 112½ calories per cubic foot on the average of three consecutive days' testings, or less than 106½ calories on any one day. The one-day catch-penalty limit for the illuminating power is 13 candles; and gas of 13-candle power is likely to give occasional tests showing only about 103 or 104 calories net per cubic foot. On the average of three consecutive days' testings, the Company escapes penalty in respect of illuminating power if the gas is above 13½ candles, which figure appears to correspond on the average to about 113 calories net per cubic foot. But the relation between illuminating power and calorific power is by no means constant; and it would not be surprising if gas testing above 13½ candles over three days showed only about 107 or 108 calories net per cubic foot. That is to say the Company may supply gas of a quality which does not impose on them any liability to forfeiture in respect of illuminating power, and yet be subjected to penalty on account of insufficiency of calorific power. It can, however, be fairly supposed that Parliament, when fixing provisionally the standards of calorific power named in the Gaslight and Coke Company's Act, 1909, did not intend thereby to compel the Company to supply gas of considerably higher illuminating power than that prescribed in the same Act. There prevailed at the time the Act was passed uncertainty as to what calorific power really corresponded on the average to gas of 14-candle power; and, consequently provision was made in the Act for a revision of the standard of calorific power after three years' experience of its application. Experience so far seems to suggest that the standard figures named in the Act may remain, provided they are made to refer to the gross or true calorific power of the gas instead of to the pseudo-scientific and misleading so-called net calorific power. A gas company who are required to supply gas of 14-candle power may fairly be expected to conform to a standard calorific power of 500 B.Th.U. (or, say, 125 calories) gross per cubic foot, with liability to incur a forfeiture if it falls below 450 B.Th.U. gross on the average of three days' testings.

SULPHUR.

The results of the testings for sulphur in the third quarter for the three years are shown in Table III. The feature of them which attracts notice is the remarkable fall experienced this year in the proportion of sulphur in the gas supplied by the South Metropolitan Gas Company. This gas is wholly coal gas, and, naturally, the sulphur in it was appreciably greater in quantity in

TABLE III.—*Sulphur (Grains per 100 Cubic Feet) in Gas for Third Quarter of Year.*

Company.	Average.			Maximum.		
	1908.	1909.	1910.	1908.	1909.	1910.
Gaslight and Coke .	39·9	34·7	37·3	72·9	57·5	71·9
South Metropolitan .	48·3	41·0	30·3	76·2	64·3	52·3
Commercial . . .	22·0	35·5	26·6	45·3	49·2	43·2

past years than in the mixed gas supplied (*e.g.*) by the Gaslight and Coke Company. This year, however, the coal gas contains on the average only 30·3 grains of sulphur, as against 37·3 grains for that mixed gas. It would be interesting to know to what change in methods of purification or working this diminution in the proportion of sulphur in the coal gas is due, and on what grounds the change has been primarily made. The sulphur returns for the other two Companies show very little difference from those for the corresponding quarter of past years.

Midland Association of Gas Managers.—The autumn general meeting of the Association will be held at the Grand Hotel, Birmingham, next Thursday. In addition to some formal business, the proposed alterations of rules will be further considered, and Mr. J. S. Lucking, of Clay Cross, will read a paper entitled "Some Notes on Carbonizing in Bye-Product Coke-Ovens, and Some Experiences in Utilizing Surplus Gas therefrom for Lighting Purposes." The paper will be illustrated with lantern slides. There will be a discussion on this, and the resumed discussion of the paper on "Carbonizing Systems and Results," read at the Spring Meeting by Mr. A. T. Harris, of Market Harborough. Mr. S. Glover, of St. Helens, Mr. T. Glover, of Norwich, and Mr. J. F. Bell, of Derby, have consented to open the discussion.

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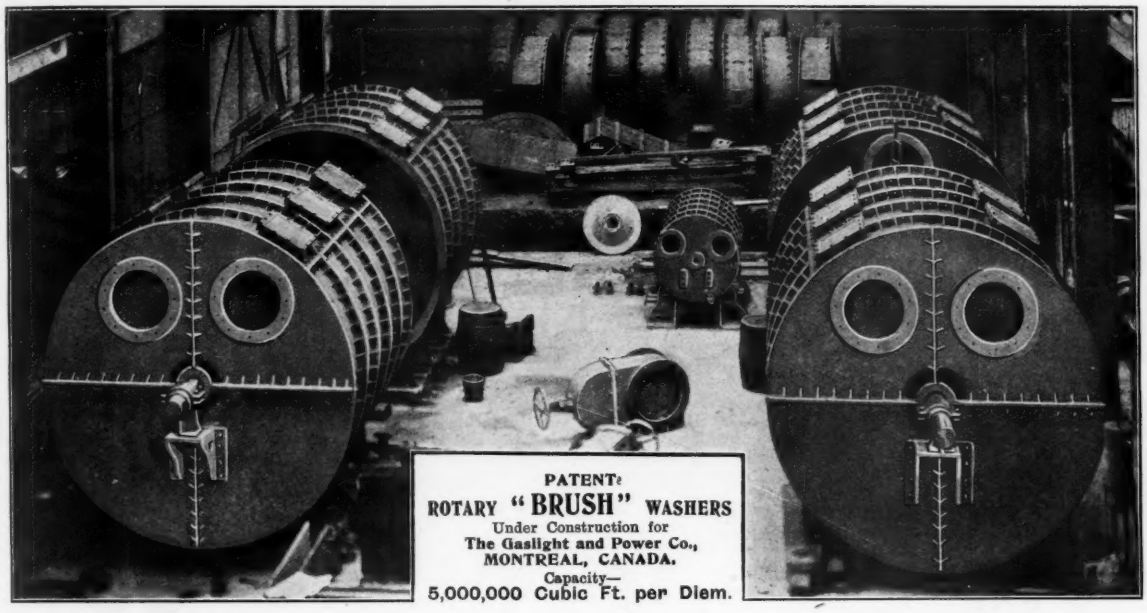

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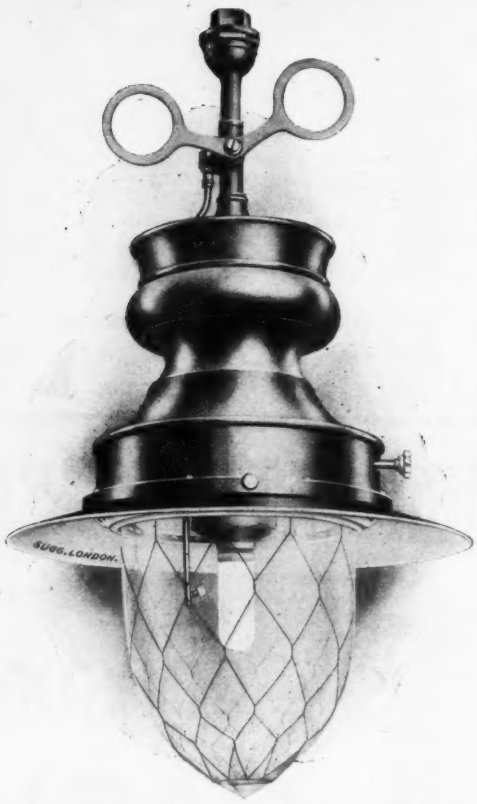

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SCOTCH GAS LEGISLATION.

[Fifth Article.]

It is impossible for the final words to be said yet on the gas legislation of the year, owing to the Standard Burner Bills and the Warrington Corporation Bill still awaiting the completion of formalities. Meanwhile, there are four Scotch measures to be reviewed.

The Order obtained by the Dunblane Gas Company, Limited, confers additional money and works construction powers. It is provided that the share capital shall not exceed £16,000, comprising £6000 ordinary "A" share capital already raised, further ordinary "B" share capital of £3000 still to be issued, and £7000 additional share capital. The "B" shares are to be issued to the holders of "A" capital rateably according to their respective holdings of capital as fully paid up; and, save as otherwise provided in the Order, the "B" capital is to be subject and entitled to all the same powers, privileges, and rights as shares in the "A" capital. The additional capital is to be issued under the new auction clauses. The dividends are limited to 10 per cent. on the "A" capital, 7 per cent. on the additional capital, and 5 per cent. on the "B" capital. Borrowing powers are allowed up to one-third of the amount of capital paid up, including the "B" capital and any premium that may be obtained on the sale of shares; but borrowed money is not to carry a higher dividend than 5 per cent. Power to construct further works is conferred. Succeeding clauses are of ordinary form, including one prescribing a standard illuminating power of 14 candles, tested by the "Metropolitan" No. 2 burner. The standard price of gas is 5s., and penny variations will carry increases or decreases (as the case may be) of dividend of 5s. per cent. on the 10 per cent. capital, 3s. 6d. on the 7 per cent. capital, and 2s. 6d. on the 5 per cent. capital. Special purposes and reserve funds are allowed. [*Parliamentary Agent: Mr. John Kennedy.*]

The Falkirk Gas Order Confirmation Act refers in its principal part to additional money powers. The amount authorized to be borrowed is £55,000, provided that "from and after the commencement of this Order, the sums required to be set apart as a sinking fund for repayment of moneys borrowed under the powers of the Act of 1894 and the Act of 1900 shall not be less than 1½ per cent. per annum on the amount for the time being borrowed; that the sum to be set apart as a sinking fund for repayment of moneys borrowed under the powers of this Order shall be not less than 2 per cent. per annum on the amount for the time being borrowed; that in the event of repayment of any moneys borrowed under the powers of the said Acts or this Order being made by way of instalment or annuity, the annual amount of such instalment or annuity shall be sufficient to pay off the moneys so borrowed within a period from the date of borrowing not exceeding the period within which full repayment would be provided by way of sinking fund in terms of the said Acts and this Order." The provision for a reserve fund is of unusual character, and is worth reproducing:

In the year ending May 15, 1911, and in every subsequent year, the Town Council shall, for the purposes of, and in connection with, the reserve fund authorized by sub-section (4) of section 29 of the Act of 1894, contribute to the said fund from the revenues of the gas undertaking a sum not less than an amount calculated at the rates hereinafter mentioned on every 1000 cubic feet of gas sold in each year—that is to say,

(1) When the price of gas sold for lighting purposes does not exceed 3s. 3d. per 1000 cubic feet, the said contribution shall be at a rate not less than 2d.

(2) When the price of gas sold for lighting purposes exceeds 3s. 3d., but does not exceed 3s. 6d. per 1000 cubic feet, the said contribution shall be at a rate not less than 1½d.

(3) When the price of gas sold for lighting purposes exceeds 3s. 6d. per 1000 cubic feet, the said contribution shall be at a rate not less than 1d.

The said reserve fund shall, in addition to the purposes mentioned in the said sub-section, be applicable towards defraying the cost of extensions of the undertaking, but, notwithstanding anything contained in the said sub-section, shall not be applicable towards the cost of renewals of meters and stoves.

The prescribed illuminating power is 14 candles, using in testing the "Metropolitan" No. 2 burner; but "the method of reporting periodical tests shall be such as to carry forward the average of the previous tests in the following manner—viz., the test made on any one occasion shall be added to the tests made on the two previous occasions, and the average of the three shall be reported as being the illuminating power so ascertained." The Council have obtained authority to charge differential rates as between gas supplied and used for private lighting purposes and gas supplied and used for any other purposes, "provided that the rate charged for gas supplied for such other purposes shall not in any case exceed the rate charged for gas supplied for private lighting purposes, and may be agreed between the Town Council and any person or persons requiring such supply, having regard to the times and periods of supply and the quantity used, and shall be the same to all persons under like circumstances." The old 10 and 15 per cent. discounts clause is adopted. [*Parliamentary Agents: Messrs. Beveridge, Greig, and Co.*]

The voluminous Act consolidating the Gas Acts of the Glasgow Corporation falls next for notice. The larger part of the clauses are not new; but they conveniently bring together all the existing legislation affecting the gas undertaking which has current application and serviceability. The limits of supply are defined; and the area is divided into the city supply district and the supplementary supply district. The Corporation are given power to maintain, extend, renew, or discontinue their existing gas-works. Authorization is also given to the manufacture and supply of non-illuminating power gas; but the sections of the Act referring to price, discounts, pressure, and quality are not to apply to the non-illuminating power gas. The Corporation, however, are prohibited from laying mains and pipes for the supply of non-illuminating gas within any burgh or district outside the city, except with the consent of the town council of such burgh, or of the county council of the county in which such district is situate, as the case may be. In connection with this non-illuminating power gas service, the Corporation are allowed to supply fittings; and the rates of charge for the gas and the fittings are to be such as may be agreed between the Corporation and the consumer. Provisions as to railway crossings appear. Power to take land by agreement to the extent of 30 acres is allowed. Sanction is also granted to the sale of (should it be deemed inexpedient to retain) the Old Kilpatrick, the Dalmarnock, and the Milngavie gas-works. The maximum price of gas is placed at 4s. 7d. per 1000 cubic feet. A great deal of discussion took place, when the measure was before Committee, regarding the question of flat and differential prices. Finally the Corporation secured the right to charge the latter, with the result that these conditions are appended to the price of gas clause:

(2) Except as by this Act otherwise provided, the price to be charged by the Corporation for gas consumed by meter shall at all times be charged equally, under like circumstances, to all consumers within the city supply district.

(3) The Corporation may supply gas for heating, cooking, or motive power, warming, ventilating, and for the particular requirements of any trade, undertaking, industry, manufacture, or business, and may do all things needful therefor, on such terms and conditions in all respects as may be agreed between the Corporation and the person to whom such supply shall be given: Provided that the rate charged for gas supplied for any of such purposes shall be the same under like circumstances to all persons.

(4) The price to be charged for public lamps within the city supply district shall at all times be charged equally (regard being had to the consumption of such lamps respectively) to the Corporation and to all local authorities of burghs and other districts within the city supply district.

(5) The Corporation may, within the supplementary supply district, or any part thereof, charge rates for gas higher than those charged within the city supply district; and such higher rates may vary in different parts of the supplementary supply district, but shall not at any time exceed the rates charged for any similar purpose within the city supply district by more than 50 per cent. of the rate charged for private lighting purposes within the city supply district, and shall not in any case exceed the said maximum price.

Whereas Castlemilk Mansion House and offices, and Croftfoot Farm Steading situate on the Estate of Castlemilk, Fernhill Mansion House and offices and lodge, and Mid Farm Steading situate on the estate of Fernhill, and Cathkin Mansion House and three cottages, situate on the estate of Cathkin, all in the parish of Carmunnock, are supplied with gas for lighting purposes by the Corporation at the price charged in the city supply district. Now therefore be it enacted that, notwithstanding anything in this Act contained, the Corporation shall continue to give such supply to the said premises or any of them, in the same manner as heretofore, at the rates charged for the time being in the city supply district; and, if at any time hereafter, the Corporation shall lay gas-mains within the parish of Carmunnock, in the near neighbourhood of any of the said premises, the owners and occupiers of such premises shall, on their putting down at their own expense the necessary pipes to connect such premises with the Corporation mains, be entitled to a supply for such premises from such mains of the Corporation at the rates for the time being charged in the city supply district.

The discount clause has been altered from what was proposed in the original draft (see "Journal," Feb. 15, p. 416) to the one prescribing 10 per cent. for prompt payment and 15 per cent. for large consumption. The prescribed illuminating power is 14 candles, tested by the "Metropolitan" No. 2 burner. In connection with the recovery of sums due for gas or meter rent, it is provided that "the Corporation may, in the case of sublets, and in addition to their recourse against the actual consumer, charge and recover from the tenant of any house or other premises who sublets such house or premises for a period not exceeding two months, the amount of rates and charges for gas used and consumed, and any other sums due to the Corporation in connection with the supply of gas by such sub-tenant during such sub-tenancy." In connection with money matters, one clause states that, in pursuance of their Gas Acts, the Corporation were authorized to borrow various sums of money, amounting in the whole to £3,700,000, of which £2,815,000 is applicable to the gas undertaking. "Therefore be it enacted that the borrowing by the Corporation of the said sum of £2,815,000 for the purposes of the gas undertaking shall be deemed to have been authorized by, and for the purposes of, this Act; and the security for the money borrowed or to be borrowed, and the interest thereon, shall be the gas undertaking, and the rents, charges, and revenues to be levied and received by them for the supply of gas and the sale of residual products: and the Corporation may again borrow any sums which may be repaid by them otherwise than by the appli-

cation of moneys received for lands and property sold by them or by sinking fund." It will be remembered that the Corporation were refused the right to apply any part of their profits in aid of the rates. There are some interesting points (more especially regarding depreciation) in the manner in which the revenue may be applied; and the clause may therefore be reproduced *in extenso*:

The Corporation shall apply all moneys from time to time received by them under the powers of this Act (not being money borrowed, or money for the application of which provision is hereinbefore made) in manner and order following, and not otherwise (namely):

(1) In payment of the expenses of, and incidental to, the raising, levying, and recovering the rents, charges, and revenues, and the borrowing of moneys for the purposes of this Act;

(2) In payment of the expenses of managing and maintaining the gas undertaking;

(3) In payment of the annuities and of the interest on money borrowed for the purposes of this Act;

(4) In payment of the amount necessary to be paid as sinking fund;

(5) In carrying the several powers and provisions of this Act into execution, including any extension and improvement of the gas-works and mains;

(6) In providing the sum necessary to meet depreciation at not exceeding the following rates:—

On gas-works at 1½ per cent. per annum;
On chemical works at 3 per cent. per annum;
On pipes at 2 per cent. per annum;
On meters at 6 per cent. per annum;
On stoves at 10 per cent. per annum;
On premium at 2½ per cent. per annum;

which rates shall be calculated on the book values of the respective assets as appearing in the accounts of the gas undertaking as at May 31, 1906, together with the net additions to such assets subsequent to the said May 31, 1906;

(7) In providing, if the Corporation think fit, a reserve fund by setting apart a yearly sum not exceeding 10s. per cent. upon so much as is outstanding for the time being of the moneys borrowed or reborrowed for the purposes of such undertaking, and investing the same, and the resulting income thereof, in statutory securities, and accumulating the same at compound interest until such fund amounts to a sum equal to 10 per cent. of the moneys so outstanding, which fund shall be applicable to answer any deficiency at any time happening in the income of the Corporation from their gas undertaking, or to meet any extraordinary claim or demand at any time arising against the Corporation in respect of that undertaking, or for payment of the cost of renewing any part of the gas works or mains of the Corporation; and whenever the said fund amounts to that sum, the income therefrom shall be applied in the same manner as moneys received by the Corporation by way of revenue in respect of the said undertaking: Provided that if and whenever the said reserve fund shall fall below the said last-mentioned sum, the Corporation may set apart such yearly sum as aforesaid until the said reserve fund shall again amount to such last-mentioned sum: Provided also that resort may be had to the reserve fund under the foregoing provision, although such fund may not at the time have reached, or may have been reduced below, the prescribed amount.

And any balance remaining in any year shall be carried forward to the revenue account of the gas undertaking for the next succeeding year, and shall, whenever and so soon as there shall be an amount sufficient for the purpose, be applied to the reduction of the gas charges equally throughout the limits of supply.

Succeeding clauses largely refer to annuities; and then there is a provision regarding a superannuation fund referable to officers or servants who have been employed for fifteen years or upwards. [*Parliamentary Agents: Messrs. Martin and Co.*]

In the section referring to gas supply of the Kirkcaldy Corporation Provisional Order Confirmation Act, opportunity is taken to incorporate the applicable parts of the Gas-Works Clauses Acts, 1847 and 1871, and to make the useful extension to section 13 of the former "provided also that every such contract entered into by the Corporation shall be alike in terms and amount, under the like circumstances to all consumers." Lands are scheduled for acquisition for gas-works purposes; and powers are given as to the construction and maintenance of works thereon. Provision is also made so that committees and their proceedings, and the audit of the accounts, shall be regulated by the Town Councils (Scotland) Act, 1900. The standard illuminating power of the gas is prescribed at 14 candles, tested by the "Metropolitan" No. 2 burner. There are several other clauses, but they are all of modern and ordinary form. The Order has been stripped of several proposals that appeared in it when under notice at the beginning of the year—an important one that has been refused being that which would have allowed surplus profits to be carried to the Burgh General Assessment.

A strange water-valve accident happened on a 30-inch main in New Orleans a few weeks ago. While a repair gang was engaged in removing a broken spreader in the valve, the spreader and disc were blown out so violently that two men were killed and two injured. It is thought the neighbouring valves on the line were manipulated in such a way that water was allowed to enter rapidly into a line containing considerable air, and a severe hammer effect was the result. But this is only a surmise.

"EXTRA-SPECIAL"

Or the "Outdoor Lighting" Number of the "Electrical Times."

THE "Outdoor Lighting" number of the "Electrical Times" made its appearance last Thursday; and we have given it the due consideration its bulk and general character deserve. As we finish reading the mass of superficial palaver it contains, we can the better understand the groan of "Meteor"—the chief of the staff of our contemporary—that found expression in the words "the labour has been considerable." It is in the main a hotch-potch of old published stuff, in a fresh garb of verbiage; and what there is new about it is compounded so much of hypothesis and worse, that really it is hardly worth while giving it consideration. If this is the kind of material that is to inspire the electrical people, and put heart into them in connection with the modern lighting methods of the gas industry—then, Heaven help them! for they will want all the help extraneous to the "Electrical Times" that is available. Against all that paper has to say, we put the concrete fact of public lighting tendering in Westminster, Hackney, Bethnal Green, Finsbury, and Stoke Newington, having resulted in favour of gas, and that gas in South London where the electricity supply is in the hands of Companies and not Borough Councils holds the public lighting field. It would be well, if, instead of all the absurd writing that is presented in this so-called special number, with assumption forming its principal ingredient, electrical journalists would go and see what is actually being accomplished in the matter of public lighting by inverted gas-burners by large concerns dependent for dividends solely upon the fruits of their commercial enterprise. Probably "Meteor" has been to see, and is sick at heart; for the notes prefacing the curious mass that succeeds lack that ordinary sprightliness to which one has become accustomed in his work.

Looking through the columns upon columns of what follows, one is left with the impression that the scheme for a special number of the kind is an easy matter to draw up, but the labour of carrying it through is immense. The general scheme is: Hunt up all the old published matter that is detrimental to gas (never mind whether or not it is relevant to present-day conditions), pad it with as much assumption and equivocation as possible, select all past published tests that are antagonistic to gas lighting and are not pertinent to the present time, avoid those that are in favour, say nothing about Mr. Bradley's strictures as to the "inefficiencies" of electric lamps or about the statements of illuminating engineering experts as to the difficulties of getting concordant illuminating power readings from electric arc lamps owing to their variability, deny the right of gas companies to charge for gas for street lighting any price lower than the average of their total expenditure per 1000 cubic feet of gas sold, but applaud electricity suppliers who charge the fraction of a 1d. for electricity for the same purpose, while charging several pence to the private consumer, add to the actual consumptions of gas-burners (to the extent of 100,000 cubic feet per annum in the case of the 3000 candle power ones), on no account whatever fail to bye-pass the truth with regard to all the modern methods of gas lighting, and never forget to convey the inference that all gas-men are liars. Link together the portions admitted by bland or else frivolous sentences (as best suits the immediate purpose); and there is the whole of the material for the outdoor number.

Now we would suggest to the "Electrical Times"—"Meteor" and the staff of that paper perhaps know the intellectual capacity and commercial ability of electrical men better than we do—that, if they desired to serve up a stimulant to electrical people in this matter of outdoor lighting, it could have been done in a much condensed and more effective form by giving some good photographs of the new high-pressure gas lighting in Victoria Street, Westminster, and also of some of the low-pressure lighting by inverted lamps in other quarters, pointing out that this is what they have to meet in future, and at prices that are considerably lower than before, owing to several causes—the new economies in gas manufacture brought about by illuminating power as a property of gas being now almost a negligible quantity, by the consumption economies of the inverted incandescent burner, and by the fact that mantle costs have been considerably reduced by the form, and character of suspension, of the inverted mantle. Is it not better to look at the facts fairly and squarely in the face than to descend to such feeble commonplaces of electrical literature as "Gas is undoubtedly fighting a losing battle, but it is dying hard?" And, again ("Meteor's" thoughts at this critical time wander back to his nursery days), "We have roused the giant out of sleep; and though Jack the Giant Killer will win in the end, it is still a giant we have to deal with—a giant moreover who is as artful as he is bulky." And as to what succeeds the peculiarly poverty-stricken introduction, it would be waste of time attempting to reply to the points seriatim, when London streets supply the irrefragable answer to the whole of them.

But there are two or three matters upon which a few words may here be said. What is regarded by our contemporary as the masterpiece of the whole production is a census of shop window and frontage lighting. The area selected is Oxford Street (from Marble Arch to Tottenham Court Road), New Oxford Street, High Holborn and Holborn Viaduct, Cheapside and Poultry, Queen Victoria Street, Ludgate Hill and St. Paul's Churchyard, Fleet Street, Strand, Piccadilly, and Regent Street. Travel the world over, and one would not find a run of streets where it was more likely that electric lighting for shop window illumination

would be generally the fashion. Such a combination of streets lined with rich retail trading establishments is not to be found elsewhere. The census shows that in these streets 2270 shops are electrically lighted, 165 gas lighted, and 79 partly electric and partly gas. This is a unique condition of things. The wealthy tradesmen started the putting in of electricity; and then it was a game of follow my leader. And fortunate it was for the electric supply companies and authorities in the area that the tradesmen did so; otherwise the condition of these suppliers would have been parlous indeed. It is a district that has a character peculiarly its own, and is not a representative one; and yet within that area the Gaslight and Coke Company (we seem to recollect hearing the Governor say) are selling as much gas now as before the electric light was introduced. But we see nothing in the reference to shop lighting in the special issue as to the troubles that are occasioned by the sudden extinction of electric light, nor is there any allusion to the Clapham and Accrington catastrophes.

Our friends—narrow-minded and stunted in their knowledge of actualities—think this census return (please read with considerable emphasis) is "a crushing revelation of gas retrogression," and yet twenty or more pages are devoted to showing how alive the gas industry is, but how dead, on old and not disinterested electrical testimony, it ought to be. We see from the last-issued Board of Trade returns that this gas "retrogression" is marked by an ascent in the year's gas business of statutory gas undertakings of 1,068,248,000 cubic feet, to a total of 173,957,395,000 cubic feet. We also see in regard to street lighting, that in the areas of the 790 statutory gas undertakings of the kingdom with which the returns deal, there were at the date of the returns 700,696 street gas-lamps—an increase on the previous year of 10,432, notwithstanding all the recent operations of Marylebone, Hampstead, Shoreditch, and several other places. This reminds, too, that when the first General Electricity Supply Act was passed, there were in the country 500 (large, medium, and small) statutory gas undertakings, with a total of 361,311 public lamps, or an average of 723. The 790 concerns in the last returns had 700,696 public lamps, or an average of 887. What is the meaning applied by "Meteor" to the term "retrogression"? It is submitted as a significant fact by our friends that during the last eighteen months 13,340 electric lamps have been added to the "large number already lighting the streets of our towns." We see nothing remarkable in this, when it is remembered what the three London boroughs—the Councils being the electricity suppliers—already referred to have done. Bearing on this point, we may appropriately reproduce a statement that was published in "Electricity Supply Memoranda" for Sept. 20:

> The number of street lamps under supply by the three London Gas Companies at June last was 77,349; while the County Council returns for 1908-9 show that the total number of electric arc street lamps in use in the administrative area (which is not, being somewhat larger, coterminous with the areas of the three London Gas Companies) was then 6574, and other varieties of electric lamps numbered 2641—a total of only 9215, against the 77,349 gas-lamps. Of the totals for electricity, 4859 arcs and 2429 of the incandescent type were in the municipal electricity supply areas! The figures for the electric lamps require some amendment, owing to the conversions from gas to electricity during the past year in Marylebone, Hampstead, and Shoreditch. But the figures for gas are absolutely correct up to June 30 last.

With reference to the arc lamps that are still being retained in Westminster, the "Electrical Times" fails to tell the story of the Hanover Square contract, or to tell its readers what Alderman Everitt said about it recently in the Westminster City Council. The matter is alluded to in our "Electricity Supply Memoranda" elsewhere this week.

There is in the number a great deal upon relative costs; and those that are not based on the old conditions of gas lighting are drawn purely from imagination. Though the claims in this regard of gas suppliers are described as being "hoary legions" and "dead bodies," it is confessed elsewhere in almost the same breath that "we know what electric lighting costs, but we do not take the trouble to find out what gas lighting costs." On what ground, therefore, are the postulations in respect of gas costs based by the "Electrical Times?" If "Meteor" knows all about these claims of gas, where is the sense in counselling a course of research in order to find the truth of the matter? There is want of coherence between assertion and advice, as there is between what appears in our contemporary's special number and what actually obtains in London north of the Thames, and has its confirmation in what is being done, and was being done long before this controversy arose over Westminster, in South London and elsewhere in association with the adoption of the inverted gas-burner in street lighting.

And as to lighting efficiencies. What is the good of quoting Mr. Bradley's old tests, that cannot possibly apply to the new inverted lamps under the new conditions, or what is the good of quoting in the latter part of 1910 Professor Morris's tests of 1908, or where is the profit of quoting tests made of lamps tested by unknown "experts," in unknown places, lamps of unknown type, and in unknown circumstances? Would anyone but an electrician accept evidence of the kind? We cannot congratulate our contemporary on the photographs it publishes. They are excellent studies in black and white; and the contrasts are remarkably sharp. Our friends find uniform illumination a very tender point to deal with, and advise that the value of intensity must not by any means be abandoned. We are not surprised at this in view of the photographic records of public electric lighting now published, and "faked" records too! for we read: "Here are busy night scenes, all the theatres are illuminated, the cab rank is full of vehicles, everything is in full swing. Yet never a soul is to be seen moving along the pavements, no omnibuses or motor cars move along the roads. Of course, they are all there; but they would not keep still, so the photographer refused to take them." Nevertheless, the photographs make good advertisements for gas, as they distinctly show how public lighting should not be done. The "Electrical Times" is thanked by the gas industry for its efforts on behalf of public lighting by gas.

EXHIBITIONS AND GAS.

Illuminated Advertising Signs and Incandescent Lighting.

THERE were last week, in different parts of London, two exhibitions organized with the view of displaying the latest and best ideas and goods of particular kinds. The first of these, which was held at Olympia, in the West, was the Business Exhibition; and there one saw numerous typewriters, calculating machines, and other modern office and shop requisites, as well as the newest suggestions for effective advertising. The other took place at the Agricultural Hall, in the North, and was the thirty-second of a series of annual Brewers' Exhibitions, the object of which is sufficiently explained by the title.

On turning to the right when entering the Business Exhibition, the visitor immediately came upon a large stand which, if he happened to be a purveyor of gas or any other commodity, must have had some interest for him. This was the display of gas-advertising signs by Mr. C. W. Freeman, who carries on business as an advertising specialist at No. 107, Cannon Street, E.C. Some twelve months since, when a similar exhibition was held, Mr. Freeman also had a stand, which secured a considerable amount of attention at the hands of those connected with the gas industry, and was the subject of a notice in the "JOURNAL" at the time. Calling on Mr. Freeman again last week, in the course of a stroll round the exhibition, he was found to be no less enthusiastic than before with regard to the field that is open to gas as a medium for advertising purposes. In fact, his own experience has already proved to his complete satisfaction that gas has a great future in this connection, if only its possibilities are properly cultivated. So great is his faith, that he has given up the whole of his electricity business, in order to concentrate his energies in the direction of popularizing the use of gas for illuminated advertisements—for which purpose, as for many others, it is, of course, remarkably efficient, extremely cheap, and absolutely reliable. It may not be in Mr. Freeman's power to command success; but, at any rate, he is doing his best to deserve it. During the run of the exhibition the number of inquiries and appreciative remarks with regard to advertising by gas showed conclusively that the subject is attracting careful attention in many quarters; but if these illuminated signs are to really take the position in connection with advertising which they are, on all counts, so admirably qualified to fill, it must be by means of the cordial co-operation of the suppliers of gas throughout the country. Such an extensive campaign as might be inaugurated, it is beyond Mr. Freeman's capacity to conduct altogether by himself. He believes, and he wishes the administrators of gas undertakings to believe with him, that an enormous business in these gas consuming devices could be built up, if companies and local authorities would join with him in opening central show-rooms, at which retailers could be invited to call and inspect all the "taking" novelties in advertising signs which are at their disposal. Meanwhile, all that can be done by a pushing man with a good article to sell, Mr. Freeman is accomplishing, and, we feel sure, will continue to accomplish.

As to the signs themselves, to give anything like a detailed description would be impossible here. And, besides, it is unnecessary; for anyone who should feel tempted to seriously consider them as being a means of increasing the consumption of gas could immediately put himself in possession of full particulars by applying to Mr. Freeman. The movable signs are mostly actuated by the heat of the gas which is used to light them; and they are thus extremely unlikely to get cut of order. In fact, Mr. Freeman has devised a flasher, worked entirely by gas, which he guarantees for a period of twelve months. With some of the signs shown, it is possible to arrange for as many as twelve changes of pictures or matter; while there are colour changing devices that can hardly fail to catch the eye, and which can be operated by an expenditure of a very few pence weekly on gas. By a special process, pictures can be made transparent; and when mounted, with incandescent gas-burners behind, they are exceedingly effective. Facias similarly illuminated, and made of two kinds of glass, in accordance with a patent of Mr. Freeman's, look very pretty. An electric arc lamp fixed in the passage-way only a few feet from the stand, in no way dimmed the beauty of a facia of this character which was over the stall. White transparent letters, outlined with gilt edges, on a rich green background, formed about as handsome a name-plate as one could possibly desire. To show what can be done, it may be mentioned that one simple sign in the form of an outside lamp has recently been purchased in very large quantities by a firm of wholesale chemists, who are sending them out to their customers; and in regard to at least three-fourths of them, the illuminant employed is gas. In another

direction, there is a new (provisionally protected) cab signal sign actuated by gas, for hotels, theatres, restaurants, clubs, &c. It is controlled from inside the building; and can be used to call any particular description of cab—by lighting up one portion or another of the sign as required. In addition to this, a hooter calls the desired cab. This appliance has met with the approval of Scotland Yard. In addition to cheapness and reliability, gas has an advantage over electricity for advertising signs in that the light is better diffused.

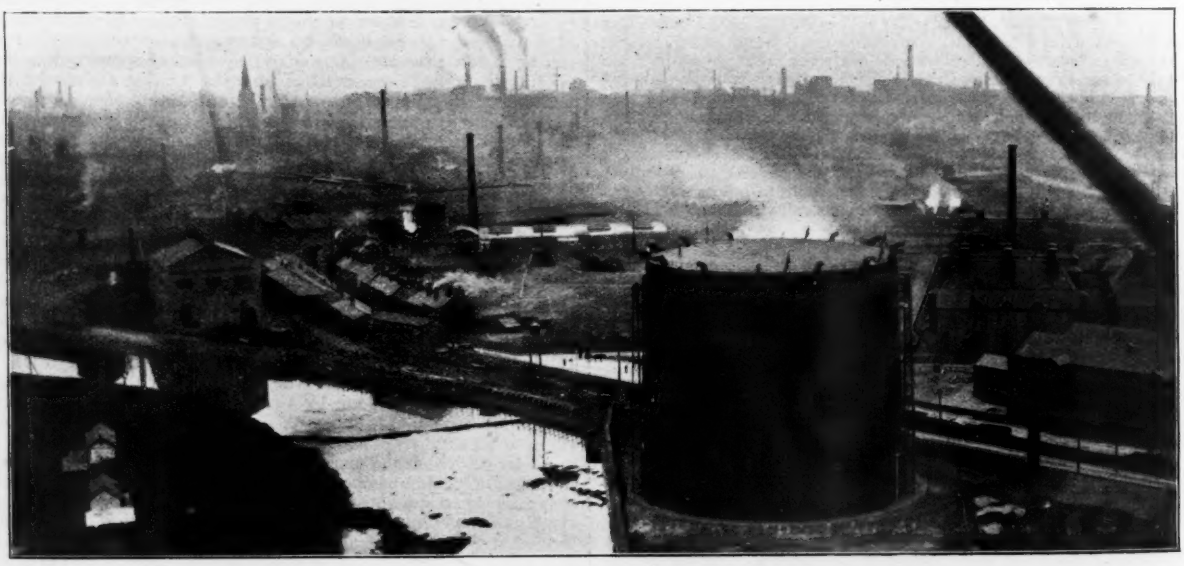
One other stand which attracted attention at the Business Exhibition was that at which the "Coverton" patent burner and mantle were displayed by Mr. W. Coventry, of Langworthy Road, Pendleton, Manchester. This is an invention which it is urged is suitable for use in the lighting of large areas, such as railway stations, goods depôts, public thoroughfares, and "in all cases where the maximum amount of light is required, combined with the minimum consumption of gas." The object in view is said to be to obtain as much light as possible from one point, instead of having in a single lamp several burners and mantles. The special form of the "Coverton" mantle—a ring without any bottom part—is stated to give it a stability which it is impossible for any other mantle to possess; while the burner is so constructed as to produce the correct flame required to convert the mantle to the highest degree of incandescence. There is also a special form of mantle holder or ring, which allows of the easy removal of the mantle without any danger of breakage, and the replacing of same should this become necessary. The maker claims that the "Coverton" mantle produces a very large volume of light, while the consumption of gas in comparison is remarkably small. This low consumption, it is stated, "is guaranteed by the fact that the flame is distributed over an annular surface, and is not supplied to the mantle in the form of a bulb, so that only the minimum quantity of gas required is allowed to pass into the mantle."

Time was when gas was responsible for quite a number of stands at the Brewers' Exhibition; but that is not the case now. While, however, the number of stalls devoted to goods of particular interest to our industry is a diminishing one, the same remark does not by any means apply to the quality of the gas apparatus that is shown. At last week's show, for instance, Messrs. A. E. Podmore and Co., of Charles Street, Hatton Garden, had a notably brilliant display of inverted incandescent gas lighting. A special feature was made of the firm's conversion fittings, which were described and illustrated in the "JOURNAL" for Sept. 13 last (p. 718); and there were also a number of lamps lit up. So effective were these latter, that it was not at all unnecessary to explain that they were working at low pressure. The mantles used in these lamps were the firm's special make, 54 mm. in length, which are found to be particularly efficient. The "Bourne" all-copper lamp was on view, as being an ideal one for brewery premises of any description. It is substantial, and is specially made for dusty and draughty positions and open sheds. There were also lights particularly adapted for saloon bars, smoke rooms, or lounges. In fact, with such an excellent all-round show, it was not surprising to learn from the representatives in attendance that "good business" was being done at Messrs. Podmore's stand.

The only other gas exhibit at the Agricultural Hall was by Messrs. Bilbie, Hobson, and Co., of Queen Victoria Street, who showed in operation one of the latest type "Hornsby-Stockport" gas-engines; and the Thorp and Marsh "B. S. T." system of high-pressure inverted gas lighting, for which they are the sole agents in the South of England. There was a patent compressor supplying numerous lamps. It is pointed out that this system is specially suitable for factories, workshops, large public buildings, open spaces, &c.; and that it furnishes a brilliant light with great economy in gas consumption.

THE NEW BURTON-UPON-TRENT HOLDER AS SEEN FROM AN AEROPLANE.

The accompanying photograph, which we have received from Mr. R. S. Ramsden, was taken from an aeroplane during the Burton-upon-Trent aviation week, which was held at the end of September. It furnishes a unique view of the new holder constructed by Messrs. Clayton, Son, and Co. at the gas-works in the town, which was fully described by Mr. Ramsden in his recent Presidential Address to the Midland Junior Gas Engineering Association, and illustrated in the "JOURNAL" for the 11th inst., pp. 127-129. On the left of the photo. is seen the gable-end of the new retort-house, which was also dealt with.



London and Southern District Junior Association.

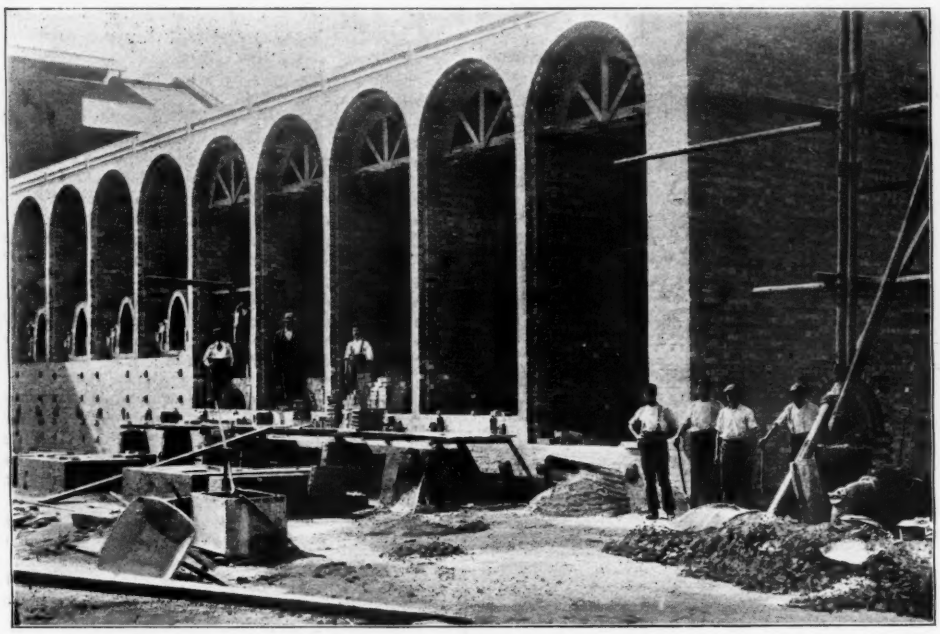
The Association are to make a promising start with the session 1910-11, the opening meeting of which is fixed for next Saturday, at the Westminster Technical Institute, Vincent Square, S.W. There will be a conversazione and exhibition of gas appliances and scientific apparatus in connection with the gas industry; and during the evening Mr. Stanley H. Jones (the Engineer and General Manager of the Commercial Gas Company) will deliver an address. The exhibition will open at 3 o'clock; and the afternoon will be occupied by various practical demonstrations which should prove of great interest to the members. Light refreshments will be available. The President of the Association is Mr. L. F. Tooth, of the Commercial Gas Company; and the organizers of the highly attractive opening meeting are Messrs. H. Rothwell and P. J. Smithers. The subsequent arrangements for the session are as follows: Nov. 12—Visit to the Brentford Gas-Works. Nov. 25—Afternoon visit to Messrs. Sugg and Co., Westminster; lecture by Dr. Harold G. Colman, on "Some Applications of Gaseous Combustion." Dec. 3—Visit to the Fulham Station of the Gaslight and Coke Company. Dec. 16—Address by the President (Mr. L. F. Tooth) on "The Industrial Aspect of Gas;" this address will be preceded by a coffee meeting. Jan. 14—Afternoon visit to the Westminster Compressing Station of the Gaslight and Coke Company; evening visit to Lloyd's Newspaper Printing Works. Jan. 27—Paper by Mr. E. W. Browning, on "Gas-Fires and Chimney-Flues." Feb. 11—Visit to the Stepney Station of the Commercial Gas Company. Feb. 24—Paper by Mr. J. G. Clark, on "Some Phenomena of the Electric Current;" this paper will be preceded by a coffee meeting. March 4—Annual dinner. March 9—Visit to the Gillingham Gas-Works and the Chatham Dockyard. March 24—Paper by Mr. Walter Upton. April 8—Visit to the Neasden Generating Station of the Metropolitan Railway. April 28—Paper by Mr. F. Thorpe, of Manchester, on "The Mixing of Gas and Air for Industrial Purposes." May 11—Visit to Messrs. Willey and Co.'s works, Exeter. May 12—Short paper by Mr. F. C. Briggs, on "Carburetted Water Gas;" and a short paper by Mr. N. B. Hodgkin, on "The Distribution Department." May 26—Annual general business meeting. The programme altogether is one on which the Council of the Association are to be heartily congratulated.

GAS MAKING AT GUILDFORD.

A New Retort-House.

INCREASING consumption, and the great likelihood of still further demands being made upon their resources in the future, led the Directors of the Guildford Gas Company some little time back to adopt a scheme which embraced the erection of a new retort-house, provided with modern coal-conveying plant and apparatus for charging and discharging the retorts; and last Tuesday afternoon, in the presence of a small party of interested persons, the machinery was started at work, and the process of gas manufacturing under the altered conditions was commenced. Thus will the Company be enabled to deal with their steadily increasing output for some time to come. The need for extension schemes of this character is always matter for congratulation of the undertaking concerned, as such works constitute a visible sign of the progress which is so much desired and, in connection with the gas industry, so frequently experienced. The competition of an Electric Light Company has in no wise disconcerted the distribution department of the Guildford Gas Company (which is under the charge of the Secretary, Mr. William Titley); and the Corporation, one notices, have had the good judgment to retain gas as the illuminant for the public lamps, the whole of which are fitted up on the incandescent system.

The new retort-house, which is the subject of this article, is a steel-framed structure 56 ft. 6 in. in width inside the walls and

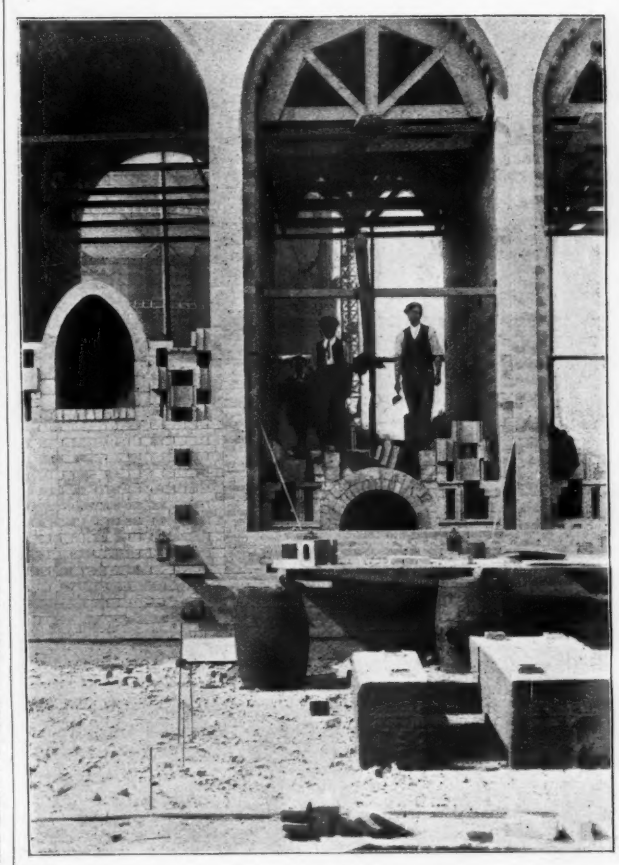


Arches of the Settings under Construction.

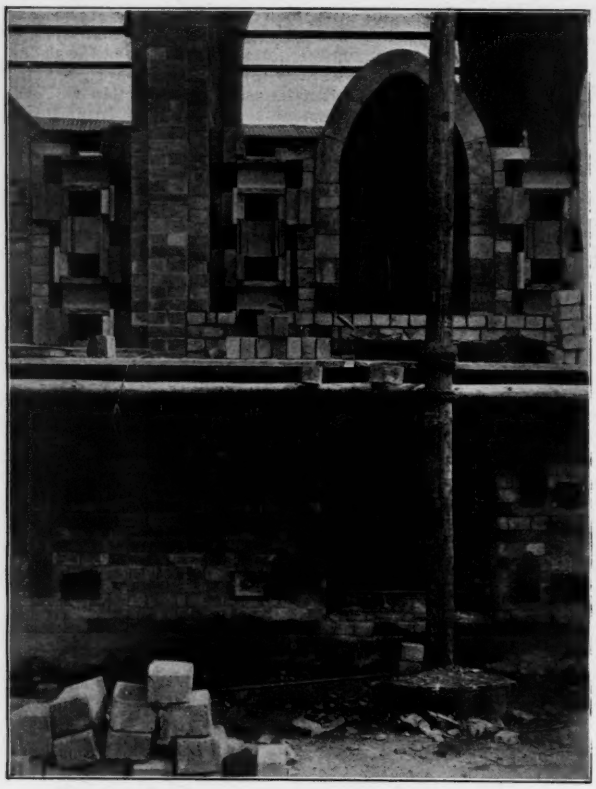
108 ft. 6 in. in length; the height being 42 feet from basement to eaves. There was on the site an old house, which was working until as recently as Feb. 1, so that no time has been lost in the work either of pulling down or building up. The old foundations, stiffened as needful, were partly used; and now they consist of a solid mass of concrete, with a minimum thickness of 3 feet—the site being a water-logged one. The house contains nine beds of eight 20-feet through retorts, five of which were under fire at the time of last week's ceremony. In each of these five benches, it may be remarked, is a different make of retort, so that data may be obtained as to which is the most suitable for future use. Messrs. Drakes Limited, of Halifax, were responsible for the iron-work of the benches and the steel framing of the building—the filling in of which was entrusted to Alderman A. Johnson, a local builder. The stage floor is of reinforced concrete; Tozer's lock-woven mesh being employed for the purpose.

The charging and discharging is performed by a Fiddes-Aldridge combined machine, the contract for which, as well as for the coal elevating and conveying apparatus, was given to Messrs. Aldridge and Ranken, of Victoria Street, S.W., who sub-let the contract for the coal-handling plant to Messrs. Cutler and Sons, of Millwall. The works are situated near the railway, from which the coal is carted; and as the charge for this cartage is only moderate, it is not thought likely that any other method, even if it was practicable, would prove more economical. Under the new scheme, the coal is fed from the store into the boot of an elevator (which, owing to the water-logged condition of the site already referred to, has been placed on the ground level), and is then taken to the top of the breaker, from which it drops down into the boot of the elevator. At the head of the elevator is a longitudinal conveyor, which feeds at any desired point the continuous hopper holding about 150 tons of coal that runs along the whole length of the retort-house. The capacity of this hopper being equal to from one-and-a-half to two days' supply of coal, it will be possible to avoid filling up on Sundays. A new coal-store is later on to be put up; and the question of dealing with the hot coke will also be taken in hand in due time. For the present, the coke is dropped through shoots under each row of retorts down into the cellar, and is then wheeled in barrows out to the yard, and there quenched.

The electricity for the stoking and elevating and conveying machinery is generated by means of two 35-H.P. gas-engines driving two dynamos. This is really a duplicate plant; as one engine and one dynamo are equal to doing more than the whole of the work that is required. No other room being available, the engine-house has been arranged under the stage-floor on the



Filling-in the Arches.

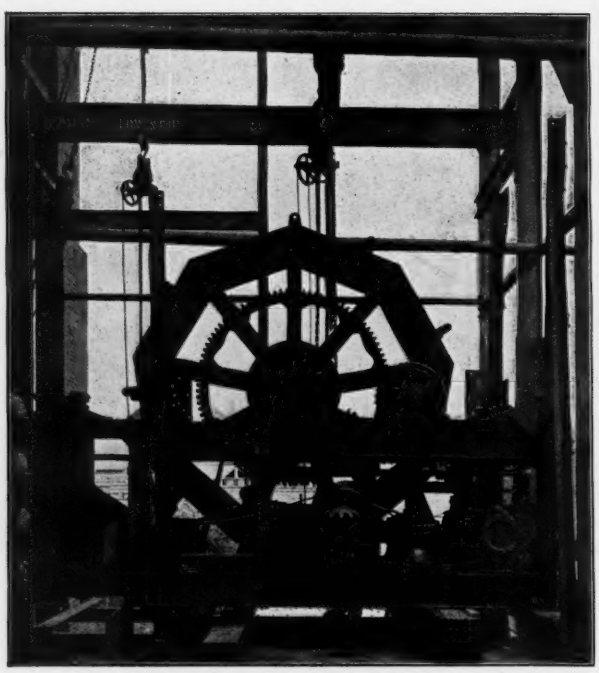


A Further Stage in the Construction of the Settings.

charging side of the retort-house—a separate back wall having been built to keep it cool. The remaining space in the basement of this side of the house there is some thought of dividing up into a workshop and a workmen's mess-room.

The contract for the whole of the brickwork of the settings and the retort-house chimney was given to Messrs. Timmis and Co., of Stourbridge. For the furnaces, the firm's improved Klönne system of regeneration has been adopted; and the doors are Timmis's patent, the object of the inventor of which was to prevent warping, by applying the closing pressure at the side. For the building of the main arches, there were used specially moulded blocks, 18 in. by 9 in. by 6 in. thick; and the furnace-charging doors are bolted up to brick blocks, so as to make them flush with the setting. The foundations were only handed over to the firm on Easter Monday; and their portion of the work was completed by the end of July—that is to say, in about four months.

The ceremony of inaugurating the new retort-house which has been here described was preceded by an excellent luncheon, to which a party of about twenty-five sat down, at the famous Lion Hotel. There was no formal speech-making; but before leaving the table, the Chairman of the Company (Mr. F. F. Smallpeice, J.P.), who presided, proposed the Loyal Toast, and subsequently "Success to those firms who have been doing such excellent work for the Company." He remarked that one and all had taken a great deal of trouble. Mr. J. G. W. Aldridge, Mr. J. A. Drake, J.P., Mr. W. D. Jones (of Messrs. Timmis and Co.), and Alderman Johnson all returned thanks. Mr. Aldridge remarked that the carrying out of the contract had been a pleasure to his firm, as every courtesy had been shown them; and Mr. Drake said that, without desiring to enter into any controversy, he thought the Company had provided themselves with a plant which in years to come would enable them to carry on their work on economical lines, and perhaps result in the lowering of the price of gas.



The Fiddes-Aldridge Machine before Mounting in Framework.

Assembling at the works after the luncheon, the visitors saw the Fiddes-Aldridge machine discharge and charge some of the retorts; and the evenness of the charges was remarked upon. Interest was aroused by the automatic filling arrangement, by which the hopper on the machine, at each operation, takes in a charge for one retort. The amount of this charge it is, of course, possible to regulate as desired. A beginning was made with 8 cwt. charges; but in all probability the amount will be increased to 10 cwt., which may be found the best for eight-hour charges with these retorts. During the inspection of the retort-house, it was pointed out that it has been provided with a continuous hydraulic main, with sections for each bench of retorts; and that the ascension-pipes are on the charging side of the retorts only. Two retort-house governors are to be installed.

When fully at work, the output of the retort-house will be from 1 to 1½ million cubic feet of gas per day; whereas with the existing old house, which it is hoped now to entirely dispense with, it is only possible to make about 400,000 cubic feet of gas. There is, however, in addition, a Humphreys and Glasgow water-gas plant, the capacity of which (originally 350,000 cubic feet per day) was increased to 550,000 cubic feet by enlarging the generator. The house that has been demolished was altogether out of date, while the one that is now to be shut down is practically worn out. So that, apart from the advantages of concentrating the carbonizing plant, it was necessary to renew. Everything in connection with the extensions has been planned by the Engineer, Mr. P. C. Cleasby. In fact, as one of the members of the Board remarked at the opening ceremony: "The Directors have had such confidence in him that they have not thought it necessary to appeal for any outside assistance." The cost of the whole scheme (exclusive of foundations) will be about £12,000; and it constitutes the first portion of a scheme for re-organizing the works which Mr. Cleasby submitted to his Directors, and which was provisionally approved.

GAS COMPRESSORS OR BOOSTERS, AND BLOW-PIPES, FOR USE WITH HIGH-PRESSURE GAS.

The greatly increased use to which gas under pressure is being put has induced Messrs. Alldays and Onions, Limited, of Birmingham, to arrange their "Empire" pressure blowers for exhausting and compressing gas for lighting, heating, and furnace work.

The compressor is of the rotary type; and a bye-pass is fitted connecting the discharge pipe with the suction pipe. This bye-pass is fitted with a valve that is adjustable to suit any required pressure up to 5 lbs. per square inch—an adjustment that can be done while the compressor is at work, by simply turning a screw. The machines may be either belt-driven or coupled direct to an electric motor; and they are made in all sizes, ranging between 300 and 40,000 cubic feet per hour.

The firm have also introduced a newly-designed blowpipe for use with compressed gas. This is a very light and handy little tool, weighing only 14 oz., and should prove a great boon to those who are using a blowpipe all day. The flame from the burners is much more intense than that of the old method; and, therefore, brazing or heating is very much quicker and a considerable saving of gas effected—said to be at least 10 to 15 per cent. A simple lever gripped by the hand when using the blowpipe governs the size of the flame at the will of the operator. The gas supply is controlled by a needle-valve at the nozzle; and no matter what amount of gas is passing, the pressure remains the same. This is an important feature.

The flexibility of control may be seen from the following figures, supplied by the Birmingham Gas Department. The pressure of gas in the main was 60 inches water-gauge.

Consumption of Gas in Cub. Ft. per Hour.	Length of Flame in Inches.	Diameter of Flame in Inches.
25 ..	8 ..	1¼
50 ..	10 ..	1½
75 ..	14 ..	2½
100 ..	16 ..	3

In each test, the gas consumption was taken on a continuous run of one hour; but in actual practice the consumption for each size of flame would be much less, as obviously the operator would loose his hold several times during the period, and the flame would go out, leaving only the very small pilot light.

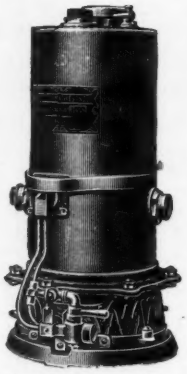
HEAT OF THE HEALTHIEST.

OBTAINED BY THE USE OF

HOT WATER RADIATORS

WORKED FROM THE

WILSON "CIRCULATOR."

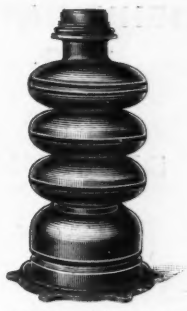


Circulator with Thermostatic Valve Fitted.
1910 MODEL.

GAS employed for Heating Water
BUT NO PRODUCTS in the Rooms Heated.

HOT WATER RADIATORS are ideal for Heating Entrance Halls, Bedrooms, Living Rooms, and for Offices, Shops, Factories, &c.

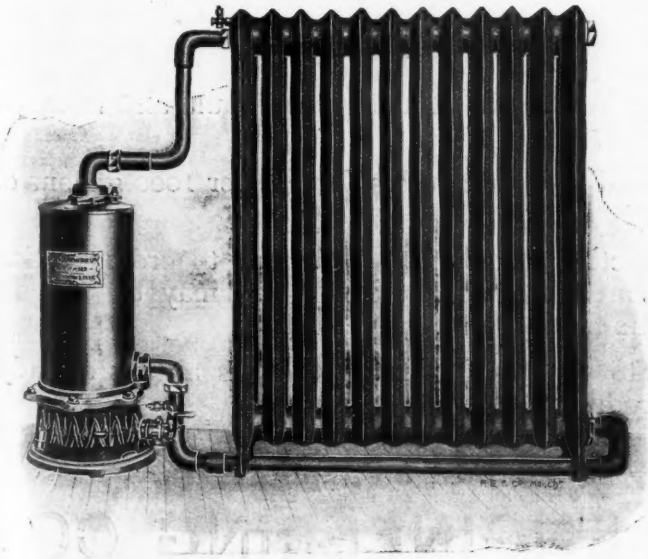
ALSO for Greenhouses and Garages.



Interior of Circulator showing Flue Chambers.
1910 MODEL.

THE
MOST ECONOMICAL AND HEALTHY HEATING.

ALL THE HEAT of the Gas available and HEAT ALWAYS PURE.



RADIATORS can be fixed in Entrance Hall, Rooms, &c., from Hot Water Pipes already laid in the House.

Kitchen-Range Boiler assisted by the **"CIRCULATOR"** will supply all Heat required at Small Cost.

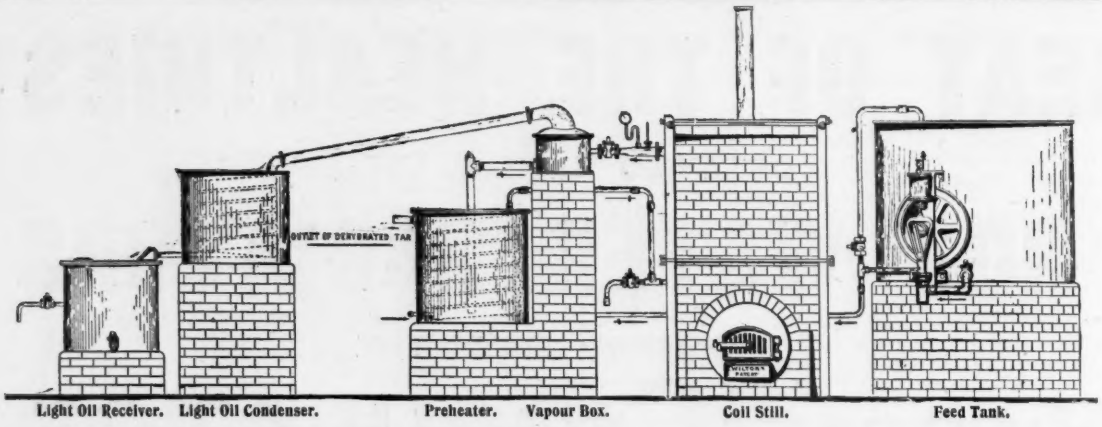
RELIABLE RECKONING:

6 cub. ft. of Gas per hour consumed through the "Circulator" will heat and maintain a 38-in. high, six double-loop Radiator at 150° F. or 24 ft. of 3-inch Hot Water Piping.

PAMPHLETS, PRICES, and PARTICULARS from

WILSONS & MATHIESONS, LTD.,
CARLTON WORKS,
ARMLEY, LEEDS.

London Show-Rooms: 76, QUEEN STREET, CHEAPSIDE, E.C.



THE REMOVAL OF WATER AND LIGHT OILS FROM TAR.

DEHYDRATED TAR.

ROAD DRESSING.

BLACK VARNISH.

ROOFING FELT.

LIGHT OILS.

GAS ENRICHMENT.

NO STEAM REQUIRED.

FUEL COKE BREEZE.

NO SKILLED LABOUR REQUIRED.

Owing to the greatly increasing demand for Dehydrated Tar in all parts of the Country, we have received numerous enquiries for an Apparatus to remove the Water and Light Oils from Crude Tar. The Apparatus which is most generally required is one capable of dealing with quantities of Tar varying from 250 to 2000 gallons per 12 hours.

The Plant which we are now bringing before your notice has been working on a large scale at Beckton during the last Two or Three Years, and is so simple that all the Tar which is distilled is first dehydrated by this process. We have therefore been experimenting with a Small Plant on the same lines, and have found that it is even more simple to operate than the larger Apparatus. There is no possibility of danger, which always exists when Tar is heated in bulk.

The Tar is pumped from the Feed Tank shown above through a preheating coil in which it becomes heated by the finished Tar leaving the Apparatus. The Tar then passes from the Preheater through the coil still, in which the temperature is raised above the boiling point of water. The Tar next passes to the vapour box from which the Light Oils and Water distill over into the Condenser and Receiver. The Tar leaving the Apparatus may be filled into Barrels or Tank Waggons and despatched immediately for sale. The Light Oil may be used for gas enrichment if desired. The System would also be available for Oil Gas Tar.

The Fuel required is about 250 lbs. Breeze per 1000 gallons of Tar.

The Water extracted from the Tar is similar to ordinary Gas Liquor and is about 8 to 10 oz. strength, and may be used in the Sulphate of Ammonia Plant.

If it is desired to sell the Light Oil, there is always a ready market for this product.

Further Particulars may be obtained on application to

THE CHEMICAL ENGINEERING CO.,

AND

WILTON'S PATENT FURNACE CO.,

HENDON, LONDON, N.W.

GAS-WORKS FOR MALTBY.

The Opening Ceremony.

As was briefly announced last week, works which have been erected for the Maltby and Bramley Gas Company, Limited, at Hellaby Bridge, were formally opened on Wednesday, the 12th inst., by Lady Mabel Smith, and that night some 500 houses in the district were illuminated by gas. Mr. John H. Brearley, of Longwood, is Consulting Engineer to the Company.

The land on which the works are erected is freehold, and has an area of an acre. The site at Hellaby Bridge was selected because of its proximity to the railway, and the advantage thereby obtained in getting supplies inwards and outwards. As soon as the volume of business warrants it, steps will be taken to secure a siding into the works. Situated as the works are midway between Maltby and Bramley, they are excellently adapted to supply the two townships.

The retort-house is 45 feet long by 32 feet wide, and has been so designed as to be suitable for coal unloading when the Company obtain a siding. The iron roof consists of five principals of suitable strength, with a ventilator 2 feet wide and 32 feet long at the apex; the remainder being covered with Welsh slates and blue Staffordshire ridge tiles. The retort-bench consists of three arches; but only two are filled at present—the third being left for future extension. The two which are completed each contain six retorts 22 in. by 16 in. by 10 ft. long, and capable of producing about 90,000 cubic feet of gas per day. The chimney rises 37 ft. 6 in. above the retort-house floor-level. The furnaces are heated by patent regenerative settings to the Engineer's own design.

The condensers are two in number, each 25 feet high, and 3 ft. 3 in. diameter. The exhauster is steam-driven, and is capable of driving forward 7500 cubic feet of gas per hour, at a speed of 90 revolutions per minute, against a gas pressure of 20 inches. It is fitted complete with bye-pass, hydraulic-regulator, and gas-governor. The steam-boiler is of the Cornish type, 12 ft. by 5 ft. The Livesey washer has a capacity of 250,000 cubic feet of gas per day. The tower scrubber is 40 feet high by 5 feet diameter, fitted with a water-distributor with revolving spreader, intermediate liquor distributor, and ladder. In the interior are boards each $\frac{3}{8}$-inch thick, with $\frac{1}{2}$-inch spaces. The purifiers are each 12 feet square, of cast iron, and are covered by luteless lids—suitable lifting gear being provided. The valves are so designed as to allow either two, three, or four purifiers to be working at the same time. The purifiers are fitted with horizontal grids. The station-meter has a capacity of 10,000 cubic feet per hour. The gasholder is of the Gadd and Mason spiral-guided type. It consists of two telescopic lifts; the outer being 62 feet and the inner 60 feet diameter, and each 20 feet deep. The tank is constructed of steel, and is 64 feet diameter. The capacity of the holder is 110,000 cubic feet. The 6-inch governor is of the compensator type. Overhead storage tanks of ample capacity are provided for tar, ammoniacal liquor, and water.

All the works mains are 9 inches in diameter; and where the district mains branch to Maltby and Bramley, the size is reduced to 6 inches. This size is carried right to the two townships named; and the subsidiary streets are supplied through 4-inch and 3-inch mains respectively. The Company have fitted up all the houses right to the point of combustion; the meters being principally of the prepayment type. At the works are provided suitable offices and workshop; and shortly the Company will arrange a show-room. The principal contracts were not let until the first days of May; and on the 8th inst. gas making was commenced. Thus within five months the Company have succeeded in erecting works, laying over 5 miles of mains, and fitting up more than 500 houses ready for using gas. The works will, with slight further expense, be capable of supplying 30 million cubic feet of gas per annum; and they are expected to satisfy the anticipated rapid development of the district for the next ten years.

The following were the Contractors: Buildings, Messrs. Gray and Sons, Tinsley; retort-bench, Messrs. John Walsh and Sons, Halifax; condensers, retort-house roof, scrubber, and purifiers, Messrs. Newton, Chambers, and Co., Sheffield; exhauster, the Bryan Donkin Company, Chesterfield; Livesey washer, Messrs. Tattersall and Sons, Elland; gasholder, Messrs. Robert Dempster and Sons, Elland; governor, Messrs. Bruce Peebles and Co., Edinburgh; works and district mains, Sheepbridge Coal and Iron Company, near Chesterfield; weighbridge, Messrs. Ashforth, Son, and Co., Dewsbury; meters, Messrs. Alder and Mackay, Edinburgh; boiler, pumps, and storage tanks, Messrs. Ellison and Cordingley, Cleckheaton.

At the opening ceremony, Councillor Ellis, a Director of the Gas Company, presided, and gave some interesting particulars in regard to the past history and present position of the gas industry. He remarked that, although they were over a century behind the times in starting a gas supply, they had at least the advantage of beginning at the point which other gas makers had got to. They were assured that their plant was thoroughly up-to-date, and would produce gas economically and of good quality. The works were designed to supply a much larger quantity than would be needed at present; but they had provided for the great developments which were expected. With the support of the householders, they expected the output to grow at such a rate as would enable them to share the benefits with the consumers. The greater the quantity used in proportion to the plant involved, the less the working expenses. Facilities would be given to all consumers to obtain cooking and heating appliances on reasonable terms.

A description of the works and plant was then given by Mr. Brearley, who went on to speak of the special facilities which will be afforded the consumers. The Company, he said, had fitted up free of charge 95 per cent. of the houses in Bramley and Maltby, and would continue to do so for a period of six months. If the Parish Councils desired to adopt the Lighting Act, the Company would spread the payment over a term of five or six years, and provide lanterns, pillars, &c., so that the ratepayers need not fear a heavy increase in the rates. This practice had been followed in other places with advantage to the public, who were thus enabled to have a system of public lighting without any undue call upon the rates. Referring to the Manager (Mr. Wilkinson), he said he knew from personal knowledge that the Company had in him a man whose services would be a benefit both to the undertaking and to the consumers.

A silver key with which to open the door of the governor-house was then presented to Lady Mabel Smith by Mr. E. J. King, of Elland, who remarked that, as the representative of one of the Contractors, he wished to congratulate the Directors of the Company on having brought to a satisfactory conclusion the construction of the work. The time occupied had been a record for shortness; and great credit was due to the Engineer for having brought the numerous Contractors so well into line, and getting the works completed in so satisfactory a manner. Lady Mabel Smith then made a short speech, and carried out the opening ceremony—for which she was heartily thanked.

After tea, the visitors inspected the works.

PADIHAM'S NEW GAS-WORKS.

Inauguration Ceremony.

The formal inauguration on Wednesday last of the new gas-works of the Padiham Urban District Council (which were described and illustrated in our last issue—pp. 187-191) was made the occasion of several interesting little ceremonies. Gas engineers from different parts of Lancashire and adjacent counties were present; and though the proceedings extended from about noon until after six in the evening, time did not hang heavy on the hands of any member of the party. There was much to see and interest the visitors about the old works and the new during the early part of the afternoon, while the gathering at the Co-operative Hall, which followed, was a very pleasant one. At noon, Mr. Thomas Riding, J.P., the Chairman of the Gas Committee, held a reception at the Council Chambers, and was supported by Mr. James Horne, J.P., the Chairman of the Council. Mr. T. H. Thompson, J.P., Vice-Chairman, Mr. J. C. Waddington, Clerk, and many members of the Council, together with Mr. A. J. Harrison, the Gas Engineer.

On leaving the Council Chambers, the party first proceeded to the old gas-works; and the inspection proved conclusively that the Council had not started a day too soon with the construction of their new works. In fact, it was a marvel to most of the party how the Gas Engineer, with such a plant, had managed to supply the town and district with gas, particularly in the winter months. It was incidentally mentioned that the site of the old works is likely to be used for public purposes; and as the value set upon it is about £6000, this will help to relieve the Gas Department of part of the cost of the new undertaking.

When the party reached the new works, Mr. Harrison presented the Chairman of the Council with a gold key, as a memento of the occasion; and Mr. Horne, before opening the main gate leading into the works, delivered a short speech. Having acknowledged the presentation, and referred to the part he took in forwarding the scheme for the new gas-works, he said he thought that the visitors at the close of their inspection would come to the conclusion that the works were ideal. Some people might say that the system of carbonization which they had adopted was not up-to-date; but he fully believed they had acted wisely in awaiting the results of the experiments which were being made with verticals in larger towns and cities than Padiham. They in Padiham had been hampered for a long time as to their gas supply; and the new works had not been erected too early, as the old premises were not only dilapidated, but were almost tumbling down in some places.

On entering the new works, the party proceeded at once to the boiler and exhauster houses, where Mr. Harrison asked Mr. Thompson's acceptance of a gold souvenir key. Mr. Thompson, in declaring the buildings open, said he could lay claim to a close connection with the gas undertaking of the town. His father was the first Chairman of the old Padiham Local Board, while he (the speaker), by a remarkable coincidence, happened to be the last. During the time his father was a member of the old Local Board, he was greatly instrumental in bringing about the purchase of the gas-works from the private Company, and the creation of annuities which made possible the acquirement of the undertaking. It was strange that the father should do this, and that the son should be one of those instrumental in getting a clause inserted in the Padiham Urban District Council Act of 1908 which enabled the authority to redeem the gas annuities by compulsory purchase. In his opinion, Padiham had taken the right course in having this clause inserted in the Bill; but it would not have been possible to have acquired the works without the annuities in 1876. In

opening the door of the exhauster-house, he said he wished the new works every success, and did not think the people of Padiham would have cause to blame the Council for the action they had taken. Inside the exhauster-house, a marble tablet built in one of the walls was unveiled. This tablet has inscribed on it the date of the opening of the new works, together with the names of the Chairman of the Council, the Chairman, Vice-Chairman, and members of the Gas Committee, and of the Gas Engineer.

An adjournment was next made to the retort-house, where Mr. Riding set the machinery in motion, and was presented with a handsome silver rose-bowl as a souvenir of the occasion—this being handed to him by Mr. J. Armitage Drake, J.P.

Mr. Riding, who was described as the "Father" of the Council, being the oldest member, expressed the hope that the new works would be successful and become a profitable undertaking for the benefit of the ratepayers of Padiham.

Following this ceremony, considerable time was spent by the party inspecting the plant, under the guidance of the Engineer. Not the least interesting part was to see the carbonizing installation at work, and also the coal and coke-handling plant in operation. Each member of the party had presented to him a souvenir booklet, containing a reprint from last week's "JOURNAL" of the description of the new works and plant. The extent of the land available for gas-works purposes is some 16,560 square yards, adjoining the Lancashire and Yorkshire Railway; and there is ample room for extensions. The works are designed to produce a million cubic feet of gas per day; but only half this quantity is at present aimed at. The works will supply gas, in addition to Padiham, to the towns of Sabden, Read, and Simonstone.

At the conclusion of the inspection of the works, the party adjourned to the Co-operative Hall, where a banquet had been arranged for by the Council. Mr. RIDING presided.

Mr. A. T. HARRIS (Market Harborough), in proposing the toast of "The Urban District Council of Padiham," said at the outset that he did not agree with the statement made by some of his friends that the engineer in the employ of a private company was more fortunate than the one engaged under a public body. In his opinion, the position of a gas engineer was very much what he made it. By the exercise of tact and discretion, he could smooth over many difficulties and create a better feeling between himself and those employing him. This was particularly so with public bodies upon which they had progressive men, such as was evidently the case at Padiham. Looking at the history of the gas undertaking in Padiham, it seemed to him that they had progressive men on the old Local Board when, in 1876, they decided to acquire the works from a private Company; and it was apparent from what they had seen that day there were progressive men on the Urban District Council now. He ventured to say that the erection of new works could not have been delayed much longer. Probably they had been putting off the evil day as long as they could, until at last they felt the time had come when the old works could no longer meet the requirements of the town and district. To those who had inspected the old works that day, it was patent that the putting down of new plant had become absolutely necessary, if gas was to be produced cheaply and efficiently. This he believed would be accomplished in the new works. In considering the question of plant for gas manufacture, those at Padiham had naturally given a great deal of thought to the method of carbonization to be adopted. At present the important matter of the carbonization of coal was in a state of transition. Padiham, however, were in the position of having to put all their eggs into one basket; and he ventured to say, from experience, that they had, under the circumstances, been wise in adopting the system they had. Padiham had a system which had been proved to be efficient, and they could look forward to the future with confidence, having room on the new site for putting down, as the consumption of gas increased, a more efficient plant, if it was proved there was a more efficient plant for their purpose. The Council and ratepayers were to be congratulated on the new works; and he hoped they would prove to be as successful as was expected.

Mr. JAMES HORNE, responding, claimed that Padiham, in regard to its public undertakings, held a position that few other towns of the same size occupied. Not only had they their own water-works and gas supply under their control, but also a sewage works.

Mr. J. C. WADDINGTON, Clerk to the Council, also responded. In the course of his remarks, he said that the Council recognized, in regard to the new gas-works, that Mr. Harrison, their Engineer, had a good scheme, and they gave him every opportunity of carrying it out. They hoped the works would be a great success in years to come, and save the rates to some extent, by reason of the profits made out of the gas manufactured and sold. The gas undertaking had always been profitable; and now that they had got new works, they were looking forward to its being more profitable still. He thought it was something to boast about that they carried their Bill for the new works, and other matters, through Parliament with comparatively slight alteration. The important clauses as affecting the gas undertaking were agreed to practically as drafted; and no greater testimony could be given to the Committee of the Council who had the matter in hand. Very few public bodies promoting Bills in Parliament obtained all they asked for; but Padiham did.

Mr. S. R. OGDEN (Blackburn) had charge of the next toast—of "Success to the New Gas-Works." He said they had seen that day the new gas-works as an accomplished fact; but how many of them realized the great amount of time, trouble, and anxiety that had been entailed in bringing the works to their present stage? No one could tell except the man who had been on the scene all the time. Having a knowledge of the difficulties with which Mr. Harrison had had to contend, it was with great pleasure that he congratulated him upon the excellent way he had carried out the work; and he was satisfied that what had been done would be of advantage to Padiham. He (Mr. Ogden) was quite of the opinion that the system of carbonization which Mr. Harrison had decided upon was the best for Padiham. With the toast the names of Mr. Riding and Mr. A. J. Harrison were coupled.

Mr. RIDING, in replying, traced the history of the gas undertaking from its inception to the present day, recapitulating a good deal of the information given in the "JOURNAL" last week. Before he concluded, he paid a high compliment to the Engineer, Mr. Harrison, for the way he had managed the undertaking since his appointment, and for the work he had done in connection with the new venture.

Mr. A. J. HARRISON, on rising to respond, was received with loud applause. He considered himself fortunate, he said, in having an entirely new site upon which to construct the works. It fell to the lot of very few men to have such a chance—and at his age, too—of constructing an entirely new works. The task was not undertaken without much thought and consideration; and he was pleased to say that all through he had had the complete confidence of his Council. He desired to place it on record that no engineer in the country to-day could have a better understanding with his directors or council than he had; and he was perfectly satisfied with the treatment his Council had meted out to him during the six years he had been at Padiham. His first acquaintance with the old gas-works was not exactly promising. He arrived to find that part of the governor-house had been blown out; and looking at the wreck, he almost wished he was back again at Brigg. Anyhow, he got the place straight in course of time; but he was soon convinced as to the impossibility of producing gas cheaply and satisfactorily in the old works, and with plant that was entirely out of date. Then there was the ground-rent going on for the site required for new works, with nothing upon it but a gasholder; and so he made up his mind that there was nothing better to be done than to push forward the scheme for a new works. The scheme was not presented to the Council without a large amount of consideration. Many an anxious night did he have while the scheme was being thought out. It was quite a fact that outsiders had no idea of the amount of work involved in preparing such a scheme as this. But now that the works were practically completed, he was satisfied that they had done the right thing for Padiham; and he was pleased to acknowledge the help he had had, not only from the Contractors, but from Mr. Ogden, to whom he was greatly indebted for advice. Mr. Ogden had not told them that he was called in by the Council to report upon his (Mr. Harrison's) scheme; and the assistance that gentleman had given him from time to time had been of the greatest possible help to him. Not only that, but he had had the help of his uncle (Mr. A. H. Harris) in the carrying out of the scheme. It was a very interesting fact that eight members of his family were connected with the gas industry—seven of them being at present in charge of gas undertakings in different parts of the country. He thought this was rather unique in the gas profession. It was too early yet to speak as to the new plant and its capabilities; but after a week's work, he was perfectly satisfied that the new works would be beneficial to the town and ratepayers of Padiham. They had a compact little works, and had provided for the future.

Mr. H. E. JACKSON, the Chairman of the Finance Committee of the Council, proposed the health of the Contractors. He considered they had been fortunate in the selection of their Contractors; and as far as he could see, the Council had full value for their money.

Messrs. J. A. DRAKE and J. W. SCOTT responded on behalf of their respective firms. The former observed that the works and plant had been put down on proved lines, which they might be sure would be of great benefit to the ratepayers of Padiham. The latter said it was worthy of note that works which in 1907 were estimated to cost £27,000 had been put down for less than that sum in 1910. They had seen that day, added Mr. Scott, one of the finest little gas-works for a Council like Padiham to have.

Mr. W. WOLSTENHOLME proposed the toast of "The Visitors," coupling with it the names of Mr. T. Duxbury, of Oldham, and Mr. A. H. Harris, of Wigston.

Mr. T. DUXBURY, responding, said that, having had an opportunity of inspecting the old works, he wondered how Mr. Harrison had managed to make gas to supply a town like Padiham with the plant at his disposal there. Only Mr. Harrison knew how it had been done. He was sure the Gas Committee could not have had any idea as to the responsibilities Mr. Harrison must have had, and the difficulties he must have had to contend with, to keep the town supplied with gas, especially in winter time. As to the new works, he could assure the Gas Committee that they were fully justified in putting in inclined retorts. He said this speaking from a long experience of inclined retorts—he was one of the pioneers in the use of them—and taking into account the requirements of a town of the size of Padiham. In his opinion, Mr. Harrison and his Committee had been wise in putting down the plant they had; and he could congratulate them upon having a very fine installation. He was pleased to hear that Mr. Ogden had given Mr. Harrison every assistance in the carrying out of his scheme. They all knew Mr. Ogden as an Engineer with great experience in the use of inclined retorts; and he was sure if it was upon this gentleman's advice they had acted, Padiham certainly would not be very far wrong. He was particularly delighted to see that at the new works they had made provision for the comfort of the stokers in the way of a mess-room, bath-room, and lavatory, because he did feel that the men got through their work much better if the gas engineer and his committee looked after them and made their lot more comfortable. Padiham had now as complete and compact a little gas-works as he had seen anywhere. The works were well arranged, and the plant such as would enable them to manufacture gas at a very low cost; and he was sure the ratepayers would have no cause to regret the expenditure incurred.

Mr. A. H. HARRIS also responded. He said he was pleased to hear that the Padiham Council had confidence in their Gas Engineer, and in the carrying out of the new works had given him the free hand they had done.

This concluded the toast list and the day's proceedings.

Official returns show that the world's consumption of nitrate of soda during the past year amounted to 43,996,966 quintals—an increase of 8,000,000 quintals as compared with the previous twelve months.

EXHIBITION BY THE SUTTON GAS COMPANY.

There has lately been held in the Public Hall, Sutton, a very attractive exhibition of gas appliances under the auspices of the Sutton Gas Company.

Taking the stands in their numerical order, the first consisted of a beautiful cosy model dining-room, designed by Messrs. Godfrey Giles and Co., and installed with the Gas Company's fittings with the view of illustrating the decorative effect produced by using inverted gas-burners. The room attracted much favourable attention; the papering, panelling and medallion work being of fine quality. At the third stand was shown the apparatus employed for testing the illuminating power of gas, provided by Messrs. William Sugg and Co., Limited, who had on view some of their well-known inverted incandescent gas-burners, lamps, and fittings, including their "Regent" and "Windsor" lamps. Their exhibit included an enamelled water-boiler, water-heaters for bath use, and gas cooking and heating appliances of all descriptions. At the next stall, the New Inverted Incandescent Gas-Lamp Company, Limited, showed their "Nico-Radio" and "Nico-Vibra" burners; and close by the Bland Light Syndicate, Limited, had on view their new type of inverted burner.

Some well-designed hand-beaten metal work inverted fittings, finished in oxidized copper, formed an attractive feature of the stand of Messrs. George Hands and Co., who also showed some of their powerful lamps for outside lighting.

Turning to the exhibits of cooking and heating appliances, Messrs. Fletcher, Russell, and Co., Limited, had an excellent display of their latest patterns of gas-fires, fitted with air and gas adjusters and with their patent non-lighting-back burners, all removable for cleaning purposes. The other appliances to be seen included water-heaters and geysers; and a small, but interesting, exhibit was a furnace for melting silversmiths' and jewellers' scrap. The character of their stand will be seen from the photograph. Messrs. John Wright and Co., Limited, and the Davis Gas Stove Company, Limited, presented a fine assortment of gas-fires, cooking-stoves, water and greenhouse heaters, washing-boilers, &c. At the stall of Messrs. Arden Hill and Co., the "Acme" gas-fires attracted much attention on account of their "Thermo" front with a single row of fuel, and having nothing before the fire to prevent perfect radiation. The firm's "Mars" radiators were also among their exhibits. In order to demonstrate the advantages of some of the latest and best appliances, a model kitchen and bath-room were fitted up, in which these were tested; the process proving very interesting to many who attended the exhibition. The fittings for the kitchen were provided by Messrs. Wilsons and Mathiesons, Limited, of Leeds, and Mr. G. S. Webb, of Sutton; and the latter, in conjunction with Messrs. Ewart and Sons and Messrs. Fletcher, Russell, and Co., fitted up the bath-room.

The Gas Company's stand, of which we give a view, was a very interesting feature of the exhibition. They showed models of gas-works plant, including the De Brouwer conveyor, wet and dry gas-meters, lighting, cooking, and heating appliances, apparatus for testing gas, and a collection of the products resulting from its manufacture.

It only remains to say that the whole of the arrangements in connection with the exhibition were carried out by Mr. G. Mead-Robins, the Company's Engineer and Secretary; and that it was opened by the Chairman, Mr. F. Budgen. Each day, Mrs. A. M. Collins gave lectures and demonstrations in cookery, which were well patronized. In the evening, when all the lamps were alight, the effect was very striking. These were of all sizes, ranging from the 500-candle power lamps exhibited by Messrs. Sugg and Co. to the smallest kind needed in the home. The gas-switches used for lighting them were supplied by the Telephos Company and the Pneumatic Distance Lighting Company.

Coke-Handling Plant for the St. Josse-ten-Noode (Brussels) Gas Company.—We learn that the St. Josse-ten-Noode Gas Company have ordered for their works at Jette-St. Pierre, of which a description was given in the "JOURNAL" for the 28th of June last, a large installation of coke-handling plant from the firm of Ad. Bleichert and Co., of London and Leipzig. It consists of a man-trolley for grab or bucket working, which runs over the storage-ground on a travelling loading bridge with a span of about 137 feet, and serves to discharge and rehandle the coke. The electrically driven trolley can also leave the bridge at any point, and pass over a slide switch on to the fixed track, the extremity of which lies over the railway line.

DISCHARGER FOR HORIZONTAL RETORTS.

There has recently been published the specification of a French patent taken out by the firm of Carl Francke for a retort-discharging machine in which the operation is performed by a series of rakes on the discharger, and by a movable plate attached to the end of it. The appliance is shown in the accompanying illustrations, fig. 1 of which is a side view of the general arrangement of the system; fig. 2, a view of the discharger, showing the position of the rakes when in action; fig. 3, a view showing their position when the bar is inserted in the retort; and fig. 4, a plan of the bar showing the construction of the rakes.

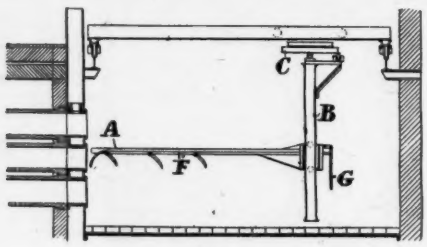


Fig. 1.

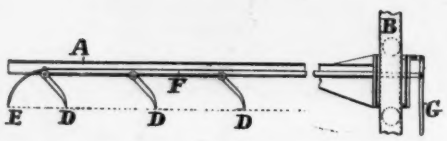


Fig. 2.

Fig. 3.

Fig. 4.

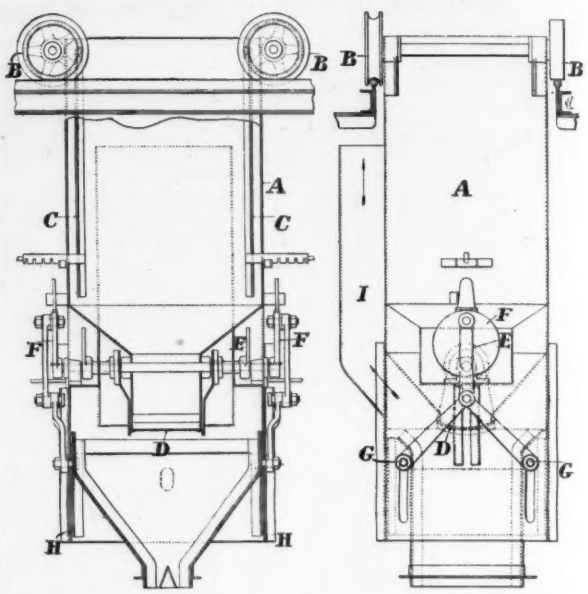
The bar A is attached to a carriage mounted on a column B in such a manner that it can be raised and lowered. The column turns upon a carriage C affixed to a travelling crane, which passes in front of the retorts, so that the discharger can be introduced into any one of them. As will be seen, the discharger is furnished with several rakes D, and at its free end is a plate E. The former are made of several rods or pieces of sheet iron, and are mounted upon the bar in such a manner as to be movable independently of each other. Consequently, during the introduction of the discharger into the retort they move back and slide flat over the glowing coke. When the bar is withdrawn, the rakes penetrate into the mass. The plate E is actuated by a rod F, extending the length of the bar, and worked by hand, either directly or by means of the lever G. In this way, the plate may be raised into the position shown in fig. 3 when the discharger is introduced into the retort, and lowered as shown in fig. 2 before the charge is drawn, so as to draw out the back coke. As the mass is gripped at several points at once, it remains in a block while being withdrawn. The end plate serves solely to bring out the fragments of coke which may have become detached from the mass.

SAFETY CHARGER FOR VERTICAL RETORTS.

The specification has lately been published of a French patent, taken out by the Compagnie Générale de Construction de Fours for an improved machine for charging vertical retorts. It is pointed out in the introduction that the mechanical appliances at present in use do not protect the men operating them from the flames and smoke which issue from the upper part of the retort during the process of charging; the consequence being that they cannot do their work so comfortably or so safely as is desirable.

The arrangement patented by the Company has been devised to remedy this defect. It is shown in the accompanying illustrations; fig. 1 being a front vertical section and fig. 2 a cross sectional view of the machine.

The machine consists of a movable framework carrying a hopper A, suspended by chains B from an overhead railway, which enables it to be brought over any retort in the series. The capacity of the hopper may be regulated as desired by means



of partitions C, furnished with rackwork as shown. The lower outlet of the hopper is closed by an oscillating circular flap D, which may be moved from the outside by means of the handle E. Below the hopper A there is another, suspended as shown in fig. 2, and moving vertically. Motion upwards or downwards is given to it by the winch F. During these movements of the hopper, the crank-pins G (fig. 2), which keep it suspended, slide through channels arranged on the sides of the chest—which is furnished on one side with a chimney I (fig. 2), starting from the space between the two hoppers, and extending vertically to the height of the upper one.

The action of the machine is as follows: After the lid of the retort to be charged has been removed, the carriage is brought over the opening. The stoker then turns one of the winches F so as to let down the bottom hopper far enough to allow of its lower opening fitting into that of the retort. In this position, the workman is able to open the flap D and allow the coal in the hopper A to descend. As long as the bottom of the lower hopper remains in the mouth of the retort, the flames, smoke, and other products of combustion can only escape by way of the hopper, and subsequently by the chimney. The result is that the men operating the charger are protected from the possibility of accidents due to the emanations referred to.

The specification contains an illustrated description of an auxiliary hopper arranged for charging vertical retorts with other material than coal.

Income-Tax Allowance for Depreciation.

Three Irish Gas Companies—viz., the Armagh, Lurgan, and Portadown—having appealed on the question of an allowance from their assessments, under Schedule D, for depreciation of plant, the cases were recently heard by the Special Commissioners sitting at Armagh. The Companies were represented by Mr. W. A. Schultz, Chartered Accountant, of 50, Cannon Street, E.C. In all three cases, depreciation had been allowed for many years, and it had now been disallowed by the Surveyor, acting on the instructions contained in the circular from the Board of Inland Revenue to which reference has already been made in the "JOURNAL." After hearing the arguments, the Commissioners decided that they had no option but to allow depreciation in accordance with the Customs and Inland Revenue Act, 1878 (39 & 40 Vic., cap. 16), and the Finance Act, 1907 (7 Edw. VII., cap. 13). The question of the amount of allowance was deferred, to enable the Companies to bring forward evidence as to the cost and probable life of the various classes of plant and machinery.

Manchester District Institution of Gas Engineers.—The 159th general meeting of the Institution will be held at Stretford next Saturday. According to the programme issued by the Hon. Secretary (Mr. W. Whatmough, of Heywood), the members will meet at the gas-works, which they will inspect under the guidance of the President, Mr. H. Kendrick, the Engineer and Manager of the Stretford Gas Company. After the inspection, a move will be made to Manchester, and luncheon partaken of in the Grand Hotel, where the meeting will be held later in the afternoon. The business will include the presentation of a report respecting the lectures at the Manchester University and the Royal Technical Institute, Salford, a description of the Stretford Gas-Works by the President, and a discussion on his Inaugural Address at the annual meeting in February. The Office-Bearers and Committee for the ensuing year will be elected; and at the close of the business the members will take tea together.

SCOTTISH JUNIOR GAS ASSOCIATION.

WESTERN DISTRICT.

The members of the Western District of the Scottish Junior Gas Association, to the number of more than sixty, paid a visit on Saturday afternoon last to the Atlas Locomotive Works at Springburn, Glasgow, belonging to the North British Locomotive Company, Limited. The visitors were received by Mr. T. Marshall, the Electrical Engineer, by whom and his staff they were shown over the works—the inspection lasting for two-and-a-half hours. There was much to be seen in the line of mechanical engineering, and many fine tools (unfortunately not at work), but there was very little indeed of direct interest to gas engineers. Gas is not used for heating, except for the one purpose of putting the tyres upon locomotive wheels. In this process a ring of bunsen flame is made to play on the tyre, which in a few minutes is sufficiently heated for placing upon the wheel. It is then allowed to cool down, and in cooling shrinks till the tyre grips with a force which no power that has yet been applied has been found capable of dislodging. In the works, there are several gas-engines of 60-H.P. downwards. They are of the single-cylinder type, and were stated to give great satisfaction in working.

At the conclusion of the visit, the President—Mr. J. Frazer, of Provan—proposed a vote of thanks to the Company for their kindness in allowing the members of the Association to visit the works, and to Mr. Marshall and his staff for showing them round. The vote was heartily accorded, and was acknowledged by Mr. Marshall, who expressed the pleasure they had all had in receiving the Association.

PHYSICAL PRODUCTION OF LIGHT.

At a Meeting of the Physics and Chemistry Section of the Franklin Institute early in the year, a paper on "The Physical Production of Light" was read by Mr. E. P. Hyde.

The author considered briefly certain questions in physiological optics which determine the light-giving properties of radiant energy, and then discussed the laws of radiation and the radiating properties of metals. He paid particular attention to various new methods for determining selective radiation; and data obtained by them were presented. The full text of the paper has lately been given in the "Journal of the Institute," from which the following abstract has been prepared; and though somewhat outside the range of subjects ordinarily treated of in our pages, it will be read with interest in view of the statement made at its close. "The limitation to the experimental methods as described thus far is found in the restriction to the study of substances which can be heated in a vacuum by the passage of an electric current. By the use of a surface bolometer to measure directly the radiant energy, rather than depend upon the electrical power supplied, substantially the same general method may be employed in a more general way. It is hoped thus, with some modifications, to extend the measurements to a study of flames, gas-mantles, and other forms of luminous sources."

Beginning with physiological optics, the author considers first artificial and natural causes of light and then visible and total spectra. He points out, at the very commencement, that light is a "sensation." If there were no eye to see, there would be no light, however many sources of radiant energy might be present. Conversely, if the eye were entirely shielded from the action of radiant energy, the sensation of light might still be experienced under certain conditions, as, for instance, by a shock to the eye caused by a violent blow on the back of the head. In contrast to this sensation of light produced artificially is the natural production of the sensation of light when radiant energy within proper limits of wave-length, of sufficient intensity and duration, falls upon the retina. The author explains, however, that his paper will be confined to a consideration of the production of the sensation of light by natural means, and moreover will have to do rather with the physical properties of radiating bodies than with the physiology and psychology of the sensation proper. Before proceeding to a discussion of his main subject, he outlines briefly the qualitative and quantitative effects produced when the retina is subjected to energy of various wave-lengths and intensities. The conclusion arrived at is that if a luminous source is to have the highest efficiency, not only should all the energy delivered to the source be emitted in the form of radiant energy of wave-lengths lying within range of the visible spectrum, but should be emitted in radiation of wave-lengths corresponding to the position of maximum luminosity in the visible spectrum.

The author next discusses the laws of radiation. He explains that there are two kinds of radiation to be distinguished. If a body does not undergo any change in its nature during the process of radiation, it would continue to radiate in the same way if, through the constant addition of heat, its temperature were held constant. This is commonly known as "pure temperature radiation." If, on the other hand, the body undergoes change, it would not continue indefinitely to emit radiation, even though the temperature were held constant. To this kind of radiation has been given the name of "luminescence." The cause of the radiation in this case is not to be found in the temperature of the system, but in some other source of energy. The author's purpose, however, is to deal with pure temperature radiation, since this is by far the commoner and more important form met with in most of our practical sources of light. He first reviews briefly the various properties of the theoretical black body—*i.e.*, a body that will neither reflect nor transmit any of the energy incident on it—and then cites in succession the laws of Kirchhoff, Stefan-Boltzmann, Wien, and Planck in regard thereto.

Having summarized the properties and laws of the theoretical black body, Mr. Hyde proceeds to consider the ways in which the pure temperature radiation from a material substance may differ from the radiation from a black body. A material body may differ from a black body in that it emits at a given temperature one-half, one-third, or one-fourth of the energy of every wave-length of that emitted by the black body at the same temperature. Such a body is sometimes called a "grey" body. But it can differ in another way, as shown in the following extract from the paper:

> Not only may the quantity of energy emitted be different from that of a black body, but the quality may also be different. Thus, if a body emitted one-fourth as much red and one-third as much green and one-half as much blue as a black body at the same temperature, it would not correspond to a grey body, but would radiate in a way which we will define as "selective"—that is, it would radiate relatively more energy in one wave-length than in another compared with a black body at the same temperature. This type of selectivity is to be distinguished, at least in degree, from that kind of selective radiation exhibited in the bright line spectra of luminous gases. Now, the question which immediately presents itself on considering the radiation from the various types of incandescent filaments and mantles is this: "Is the high efficiency of the metal filament lamps and the rare earth mantles to be ascribed to a higher working temperature of the luminous substance, or to a selectivity in its radiation such that, at a relatively low temperature, a preponderance of energy is emitted in the visible spectrum as compared with the radiation from a black body at the same temperature?"

The author goes on to explain that this high efficiency of which he has been speaking may be obtained by one of three possible ways or by a combination of them. If the radiation is what has been defined as "luminescence," the radiated energy might lie principally in the visible spectrum. If this were the case, as is probable in the radiation from the firefly, the efficiency would be very high. Secondly, high efficiency might be obtained by an excessively high temperature; and the third way is through selective radiation in favour of short wave-lengths. We are told that if the ratio of the energy emitted in the visible spectrum to that emitted in the infra-red spectrum were twice as great for a given substance at a definite temperature as for a black body at the same temperature, the substance would have double the efficiency of the black body as a luminous radiator, provided the distribution of energy in the visible spectrum of the two were the same. But before discussing the methods available for determining whether the high efficiency of metal filament lamps is due to the high temperature at which the filaments operate or to a pronounced selectivity in the radiation of the filaments, the author points out how low is the efficiency of even the most efficient light sources. He says the ratio of the energy in the visible spectrum to the total energy radiated is probably less than 0·2, even for one of the most efficient lamps known—viz., the flame arc; while for incandescent lamps the percentage of energy available for light is still less. In other words, perhaps less than 5 per cent. of the energy put into a tungsten lamp is radiated in the form of light rays; the other 95 per cent. being radiated in the form of heat rays of wave-lengths too long to excite the human retina.

In order to show, however, how rapidly the photometric efficiency would increase with comparatively small increases in temperature, Mr. Hyde shows in the following table the relation between temperature and candle power of polished platinum at various degrees, as given by Lummer and Kurlbaum.

TABLE I.—*Coefficient of Change of Candle Power with Change of Temperature for Platinum.*

T (Absolute) Deg. C.	X.	T (Absolute) Deg. C.	X.	T (Absolute) Deg. C.	X.
900	30	1200	19	1600	15
1000	25	1400	18	1900	14
1100	21				

It will thus be seen that at a temperature of 1900° C. (absolute), or a little below the approximate working temperature of a 3·1-watt carbon lamp, the photometric intensity increases approximately fourteen times as rapidly as the temperature. Thus, a change in temperature of 1 per cent. would cause an increase in candle power of 14 or 15 per cent. Since for 1 per cent. a change of about 5 per cent. in energy would be required, the increase in efficiency corresponding to an increase of 1 per cent. in temperature would be about 9 or 10 per cent. at 1900° C. At lower temperatures, the gain in efficiency would be greater, and at higher temperatures less, than that given for 1900° C.

The author next passes on to consider the different methods of studying selectivity. He says that about two years ago, while he was at the Bureau of Standards, he developed two photometric methods for giving a positive qualitative criterion as to the relative selectivity of two radiating substances, and applied these methods to a preliminary study of the various incandescent electric lamps then in use. Owing to the enforced interruption of the work consequent upon leaving the Bureau, the investigation

was not completed. Most of the essential features of the methods and the preliminary results obtained were, however, described before the American Physical Society, and later presented before the Illuminating Engineering Society. To the best of his knowledge, the application of these methods to the various carbon, tantalum, tungsten, and osmium lamps gave the first definite data as to the relative selectivity of these filaments. In the paper under notice, these photometric methods are discussed in more detail than heretofore, and, in addition, further experimental data are presented, particularly with reference to the black body and platinum as studied by the same methods as those used with the other radiating substances. In both methods, the starting-point consisted in bringing the two filaments to the same distribution of energy in the visible spectrum by means of spectro-photometric measurements. The author desired to compare the radiating properties of the filaments at different temperatures; but in order to avoid at the beginning of the investigation any direct-temperature measurements, he selected as his arbitrary temperatures those which a particular carbon filament had at three definite voltages over a considerable range. Thus, he compared the radiating properties of the various filaments when they were at a colour match with the standard lamp at 75 volts, when they matched it at 100 volts, and when they matched it at 125 volts. The standard lamp used was a treated carbon filament of about 3·5 watts per candle at 110 volts. The method, therefore, was to determine for each lamp the voltage at which it matched in colour the standard lamp at 75 volts, 100 volts, and 125 volts successively; then burning these lamps at the determined voltages to measure the coefficient of change in candle power corresponding to 1 per cent. change in watts, and to measure the lumens per watt for each lamp. The results are given in Tables II. to IV.; and they include measurements on lamps of untreated, flashed, and metallized carbon, tantalum, tungsten, osmium, platinum, and "helion" filaments, and also on the electrically heated black body. The author makes the following remarks on the tables.

TABLE II.—*Standard Lamp at 75 Volts (Black Body at 1689° C. Absolute).*

Substances Investigated.	k* (Absolute Values).	k (Relative Values).	Lumens per Watt (Absolute Values).	Lumens per Watt (Relative Values).
Black body {Observed	3·50	1·00	..	..
Black body {Computed	3·60	1·04	..	..
Untreated carbon	3·45	1·00	0·39	1·00
"Helion" lamp	3·45	1·00	0·38	0·95
Flashed carbon	3·35	0·97	0·41	1·05
Metallized carbon	3·40	0·98	0·41	1·05
Platinum	3·10	0·89	..	..
Tantalum	3·00	0·86	0·50	1·30
Tungsten	2·85	0·82	0·59	1·50
Osmium	2·85	0·82	0·72	1·85

* k is in each table the percentage change in candle power corresponding to a change of 1 per cent. in watts. The relative values are in terms of $k = 1$ for untreated carbon.

TABLE III.—*Standard Lamp at 100 Volts (Black Body at 1886° C. Absolute).*

Substances Investigated.	k* (Absolute Values).	k (Relative Values).	Lumens per Watt (Absolute Values).	Lumens per Watt (Relative Values).
Black body {Observed	..	..	..	..
Black body {Computed	3·25	1·06	..	..
Untreated carbon	3·05	1·00	1·50	1·00
"Helion" lamp	3·00	0·99	1·50	1·00
Flashed carbon	3·00	0·98	1·60	1·10
Metallized carbon	3·00	0·99	1·55	1·05
Platinum	2·75	0·90	..	..
Tantalum	2·60	0·86	1·70	1·15
Tungsten	2·55	0·84	2·00	1·35
Osmium	2·50	0·83	2·35	1·55

TABLE IV.—*Standard Lamp at 125 Volts (Black Body at 2058° C. Absolute).*

Substances Investigated.	k* (Absolute Values).	k (Relative Values).	Lumens per Watt (Absolute Values).	Lumens per Watt (Relative Values).
Black body {Observed	..	..	..	..
Black body {Computed	3·05	1·11	..	..
Untreated carbon	2·75	1·00	3·5	1·00
"Helion" lamp	2·70	0·98	3·6	1·00
Flashed carbon	2·65	0·98	3·7	1·05
Metallized carbon	2·75	1·00	3·7	1·05
Platinum	..	..	..	..
Tantalum	2·35	0·86	3·9	1·10
Tungsten	2·40	0·88	4·4	1·25
Osmium	2·40	0·87	4·9	1·40

In the first column of Table II., which contains the results obtained at a colour match with the standard lamp at 75 volts, are given the various substances investigated; the second column contains the ratios (k) of the percentage change in candle power to the percentage change in the total energy radiated (taken as equivalent to the watts supplied); and the third column, the relative values of k expressed in terms of the value of k for untreated carbon as unity. By expressing the results in this way, the relative differences among the different types of lamps are more readily seen. In the fourth column are given the lumens per watt, on the basis of the international candle; and in the fifth column, the same quantities expressed in terms of the value for the untreated carbon lamp taken as unity. Tables III. and IV. contain similar data at the higher temperatures corresponding to a colour match with the standard carbon lamp at 100 volts and 125 volts respectively.

The results are quite interesting. Thus it will be noticed (*vide* Table II.) that when these various substances have the same distribution of energy in the visible spectrum, the lumens per watt range from 0·39 to 0·72 in absolute value, or from 1 to 1·85 relatively. If there were no relative selectivity, the lumens per watt would be the same for every type. There is marked evidence, therefore, that there is considerable selectivity among the different types of filaments; and it is interesting to note the order in which the filaments arrange themselves. A higher value of lumens per watt—as, for example, the value 1·85 for the osmium lamp as compared with 1 for the untreated carbon filament—indicates that when the osmium filament has the same distribution of energy in the visible spectrum as the untreated carbon filament, the spectral energy curve of the osmium filament drops off considerably in the infra-red as compared with the energy curve of the untreated carbon. In other words, the osmium will radiate selectively in favour of shorter wave-lengths—that is, in favour of the visible spectrum—and is therefore a more efficient luminous radiator than an untreated carbon filament. It would appear from the table that the "Helion" lamp is, if anything, less selective in favour of shorter wave-lengths than the untreated carbon. The small difference shown, however, between 1 and 0·97, may be accounted for by experimental error; so that we might say that the "Helion" filament behaves much like the untreated carbon filament. It should be explained, however, that the "Helion" filaments which were used in this investigation were quite old, and it is barely possible that the deposit of silicon had entirely disappeared, and that we were simply studying the properties of the base carbon, which would readily explain the results obtained. The treated carbon and the gem filaments are more selective than the untreated carbon; the tantalum considerably more selective; the tungsten still more so; and, finally, the osmium most selective of all.

The results obtained at the higher temperatures (Tables III. and IV.) are quite similar to those found at the lower point. By both methods the filaments arrange themselves in the same order as was found at 75 volts; but the numerical differences are in some cases considerably smaller. Thus at 75 volts the number of lumens per watt of the osmium lamp is almost twice that of the untreated carbon lamp; whereas at 125 volts it is less than 1½ times that of the untreated carbon lamp. In interpreting the results given in the tables, it may be stated that there is relative selectivity among the filaments beyond any doubt; but to what extent the high efficiencies of the metallic lamps are to be ascribed to selectivity, and to what extent to the high temperatures at which the filaments operate, is not by any means immediately apparent from the data given. In order to arrive at any definite conclusion in regard to the amount of the selectivity, one must know under what conditions of operation the filaments are at the same true temperature; and at present there are no ready means available for making this determination.

It will be noted, from the data given in Table II., that when the untreated carbon and osmium filaments are at the same colour the lumens per watt of the osmium filament are 1·85 times those of the untreated carbon filament. This means that, relatively, more of the energy emitted by the osmium filament lies in the visible spectrum than with the untreated carbon filament, and that therefore the osmium filament is most probably radiating selectively in favour of the shorter wave-lengths. The numerical value of the effect depends, however, on the relative temperatures of the two filaments. If they are at the same temperature, the osmium is almost twice as efficient as the carbon lamp when they are both at the same low temperature corresponding to a colour match with the standard carbon lamp when operated at 75 volts. If, on the other hand, the temperature of the osmium filament is higher than that of the carbon filament, then one cannot tell whether the increased efficiency of the osmium lamp is due to its selective emission, or to the slightly higher temperature at which it is operating. Our knowledge of platinum radiation would lead one to expect, however, that the temperature difference is in the opposite direction. If we imagine a radiating body which tends to exaggerate in its emission the energy of the shorter wave-lengths—that is, a body which emits a larger proportion of its total radiant energy in the visible spectrum as compared with a black body at the same true temperature—it is probable this property of selective emission would obtain in the visible spectrum also; so that the emission in the blue would be relatively larger than the emission in the red as compared with the emission from the black body at the same temperature. If this assumption, which would seem to be true for platinum, is true for tantalum, tungsten, and osmium, then the values recorded in the tables give, in every case, the lower limit of the effect of the selectivity on the efficiency of the filaments.

It is possible that the difference between the working temperatures when the filaments are at the same colour becomes more pronounced as the absolute temperature is increased, and that

this may account for the smaller differences in lumens per watt at the higher voltages as compared with the results obtained at 75 volts. At all events, one can see from Tables III. and IV. that if the assumption contained in the previous paragraph is true, an osmium lamp at the same true temperature as that at which an anchored oval treated carbon filament operates when consuming about 3·1 watts per mean horizontal candle—colour match with a standard carbon lamp at about 115 or 120 volts—would show an efficiency higher than that of the carbon lamp by more than 35 or 40 per cent. One cannot estimate how much higher the efficiency would be without a knowledge of the temperature difference which exists between the osmium and treated carbon filaments when at a colour match.

From the data given in the tables for tantalum and tungsten, it is evident that for these also, as well as for osmium, the selectivity would seem to play an important part in causing the high efficiency, particularly in the case of tungsten. It cannot be emphasized too greatly, however, that all the deductions in regard to the effect of selectivity in partly explaining the high efficiency of the metallic filament lamps are based upon the single assumption that if a black body and a metal are at such temperatures as to show the same distribution of energy in the visible spectrum (colour match), the temperature of the black body is at least as high as, or higher than, the temperature of the metal. This is true for platinum—the only metal that has been investigated; but the writer cannot say positively that it is true for other metals.

Summary.

The author closes his paper with the following *résumé* of the new photometric methods and results.

In summarizing the two photometric methods which have been discussed, there are two features to be emphasized: (1) The view-point which constituted the basis of the measurements; and (2) the extreme simplicity of the methods employed. The view-point consisted in comparing the radiating properties of various substances when brought to the same distribution of energy in the visible region of the spectrum. The method employed to secure this condition consisted merely in bringing the two sources to a match in colour by the use of an ordinary Lummer-Brodhun contrast photometer. The two methods used in the study of the radiating properties under this condition consisted merely in determining the lumens per watt, and the ratio of the percentage change in watts. Except, therefore, for the work on the electrically heated black body as a reference-point, and for the check measurements made with the spectro-photometer and the infra-red spectrometer, the investigation could be carried out with an ordinary photometer and adequate ammeters and volt-meters.

The view-point lying at the basis of the measurements is at the same time quite old and yet distinctly new. One of the oldest methods of pyrometry depended upon the colour of the light as determined by eye observations, without reference, however, to any standard. But this old method could lay claim neither to any high degree of accuracy, nor to any theoretical application to the study of the radiating properties of matter. It is true that the black body temperature, as determined in the ordinary way with the customary optical pyrometers, is lower than the true temperature of the body; but the equation of absolute emissivity does not enter when the method of comparison is solely by colour match. In fact, the true temperature of the selective body is quite probably lower rather than higher than the temperature of the black body when at a colour match; in this way affording an upper limit of temperature, just as the ordinary methods of optical pyrometry afford a lower limit of the true temperature.

The results obtained by the application of the photometric methods show very interesting facts. All the metals studied are selective, and, as would seem probable from the results, selective in the same way—*i.e.*, in favour of the shorter wave-lengths. All three of the metals, tantalum, tungsten, and osmium, appear to be more selective than platinum—the osmium deviating farthest. On the basis of one assumption, which, though probable, is not necessarily true, the conclusion results that, when at the same true temperature, osmium is at least 40 or 50 per cent. more efficient as a luminous radiator than untreated carbon.

Determination of Sulphur in Coal Gas.—This subject was dealt with by Mr. H. J. M. Creighton before the Nova Scotian Institute of Science. The paper has appeared in the "Transactions;" and the following abstract was recently given in the "Journal of the Society of Chemical Industry." In the determination of sulphur in coal gas by burning a known volume of the gas in a special burner surrounded with lumps of ammonium carbonate, and passing the combustion gases into a glass tower filled with glass balls, the alkaline liquid collected in a beaker below the tower was occasionally observed to contain a precipitate of aluminium hydroxide. This was derived from the glass balls, some of which were greatly corroded. The corrosion could not have been due to the ammonium carbonate, as the white precipitate was observed only in the case of gas made from coals high in sulphur (largely in organic combination). Experiments as to the effect of aluminium compounds on the determination of the sulphur as barium sulphate showed that in a solution containing 0·5 gramme of ammonium sulphate and 0·025 gramme of aluminium, there would be an error of about 1 per cent. in the sulphur determination. To avoid this error, it is necessary to use glass balls free from aluminium when determining sulphur in gas by the method described.

MEASURING AIR OR GAS SUPPLY TO ENGINES.

In the "Journal" for the 13th ult. (p. 721), we gave the official abstract of a paper read by Mr. W. E. Dalby, M.A., M.Inst.C.E., before the Engineering Section of the British Association, "On the Direct Measurement of the Air Supply to a Gas-Engine by Means of an Orifice, and the Calibration of the Orifice." The following is the full text of the communication.

Introduction.

It is always desirable when experimenting with a gas-engine to know the proportion of air to gas in the charge. The measurement is usually made by an indirect method. The exhaust gas from the engine is analyzed; and this, together with an analysis of the gas supplied, furnishes data from which the air supply may be computed. In general, the method is not very accurate, and probably the errors may amount to 10 per cent. even in engines running with no hit-and-miss governor.

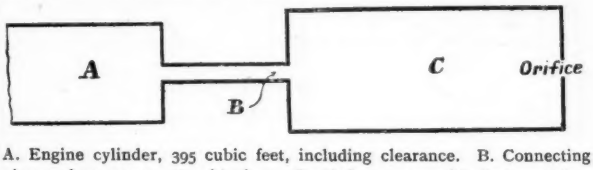
At the Ashton trials of the Committee of the Institution of Civil Engineers,* following a suggestion of Professor Unwin, an endeavour was made to measure the air supply directly by means of an anemometer placed opposite an orifice in an air-box; the box forming an enlarged continuation of the air suction-pipe of the engine. The anemometer readings were subsequently calibrated by the device of driving the engine as a pump, and deducing from the indicator diagrams of the pumping the weight of air drawn through the orifice corresponding to a definite reading on the anemometer.

Professor Ashcroft, in a paper contributed to the Institution of Civil Engineers, on "Experiments on a Method of Measuring the Air or Gas Supply to Engines and Furnaces," described a method of measuring the air supply to an oil-engine forming part of the equipment of the Engineering Laboratory of the Central Technical College. An air-box was placed on a continuation of the air suction-pipe provided with an orifice at one end, a part of one side of the box being closed with an india-rubber sheet to act as a pressure-equalizer at the moment the engine drew in a charge. The peculiarity of the method was that the orifice was almost as large in diameter as the suction-pipe of the engine; consequently the difference of pressure on the two sides of the orifice was extremely small. This small pressure was measured by a specially designed and sensitive indicator, and the quantity of air flowing through the orifice was inferred from the small difference of pressure measured by the instrument. The orifice was calibrated, as in the Ashton trials—viz., by running the oil-engine as a pump, and from the corresponding indicator diagram deducing the weight of air flowing through the orifice for a difference of pressure measured by the sensitive indicator placed on the air-box.

In the method about to be described, an orifice is used, but it is made small enough, in relation to the quantity of air flowing, to require a difference of pressure on the two sides of the orifice large enough to be conveniently observed by means of a U-tube. The special feature of the experiments is the method of calibrating the orifice. There are difficulties in deducing the weight of air from a P V diagram alone, but no difficulty if the temperature can be measured directly at various points on the diagram, where the pressure and volume are accurately known. The novelty of the method consists in the direct measurement of the temperature of the air at certain points in the cycle when the engine is used as a pump.

General Description of the Apparatus.

The gas-engine with which the apparatus is connected is one of 10-H.P., made by Crossley. The cylinder is 7 inches diameter and 14-inch stroke. The air suction-pipe is prolonged, and is finally enlarged into a box 2·66 square feet cross-sectional area. A sharp-edged orifice bored out of a brass plate is placed in the centre of the flat end of the box with the sharp edge on the outside. A U tube on the side of the box near the orifice serves to measure the difference of pressure on the two sides of the orifice.



A. Engine cylinder, 395 cubic feet, including clearance. B. Connecting pipe and passages, 28 cubic feet. C. Air-box, 19·7 cubic feet capacity; cross sectional area, 2·66 square feet. Total capacity between orifice and admission valve, 47·7 cubic feet.

Fig. 1.

A feature in the experiment is the use of oil in the U tube. It damps out oscillations, and does not evaporate, and enables a steady reading to be obtained. The accompanying diagrammatic sketch (fig. 1) shows the arrangement. The volume of the apparatus between the admission valve on the engine and the orifice in the box is 47·7 cubic feet. A is the engine cylinder, the capacity of which is 0·395 cubic foot, including clearance; B is the connecting-pipe and passages, 28 cubic feet; and C is the air-box,

* See "Journal," Vol. XCV., p. 635.

of 19·7 cubic feet capacity (or a cross-sectional area of 2·66 square feet).

Method of Calibration.

The engine is coupled direct to a dynamo, which, for the purpose of these experiments, is used as a motor to drive the engine as a pump. The air drawn in passes through the Otto cycle, with the difference that there is no explosion; so that the expansion curve corresponds very nearly, but is slightly below, the compression curve. We are not concerned, however, with the greater part of the diagram. All that is necessary is to measure the pressure, volume, and temperature directly at two points—viz., at the end of the exhaust stroke, and at a point in the compression stroke just after the admission-valve is closed. From the first measurement the air in the clearance space is found, and from the second measurement the total air in the cylinder is computed. The difference is the air drawn in through the orifice per cycle, providing the valves of the engines are suitably set.

Let P V T be the absolute pressure, the volume, and the absolute temperature measured at the end of the exhaust stroke. Then

$$P\,V = 0{\cdot}665\,w\,T,$$

in which P is the pounds per square inch absolute,

V is the volume in cubic feet,

T is the absolute temperature in degrees C.,

w is the weight of air in pounds.

Then the weight of air shut in the clearance space is

$$w = \frac{P\,V}{0{\cdot}665\,T}\ \text{lb.}$$

Similarly, if $P_1\,V_1\,T_1$ are the corresponding measurements at a point just after the admission-valve is closed,

$$w_1 = \frac{P_1\,V_1}{0{\cdot}665\,T_1}\ \text{lb.}$$

Hence the air drawn into the cylinder per cycle is

$$(w_1 - w)\ \text{lb.} = \frac{1}{0{\cdot}665}\left\{\frac{P_1\,V_1}{T_1} - \frac{P\,V}{T}\right\}$$

If the engine-shaft makes N revolutions per minute, and the air passing through the orifice per second is W lb.,

$$W = \frac{N}{120}\,(w_1 - w) \quad (1)$$

Again, along a stream-line passing through the orifice

$$\frac{v^2}{2g} + \frac{p}{D}\ \text{is sensibly constant,}$$

where

v = the velocity in feet per second,

p = the difference of pressure on the two sides of the orifice,

D = the density of the air.

The discharge through the orifice in pounds per second is given by

$$W = a\,D\,A\,v = a\,D\,A\,\sqrt{\frac{2g\,p}{D}}$$

The coefficient of discharge a is introduced to allow for the variation of the component velocity over the area of the orifice, and for frictional losses.

The difference of pressure p is measured by a difference of level h in a U-tube containing liquid of a specific gravity s. Therefore p may be replaced by

$$p = s \times 62{\cdot}5 \times h.$$

Putting $s = 0{\cdot}9$, the expression reduces to

$$\text{W lbs. per second} = 0{\cdot}418\,a\,A\,\sqrt{h\text{D}} \quad (2)$$

The area A of the orifice is in square inches; the height h is in feet; the density of the air D is in pounds per cubic foot.

The coefficient of discharge a can be computed from

$$a = \frac{W}{0{\cdot}418\,A\,\sqrt{h\text{D}}}$$

W is found from (1) by means of the direct observations taken of pressure, volume, and temperature. The height h is observed directly on the U-tube at the side of the box, and D is calculated from P ÷ 0·665 T, where T and P are respectively the air temperature at the entry to the orifice in absolute degrees Centigrade, and P the barometric pressure in pounds per square inch.

Measurement of the Pressure and Volume.

Diagrams were taken with an optical indicator of the author's design, stopped-down so that the lower part of the diagram is obtained to an enlarged pressure scale. A feature of the indicator is that each diagram is calibrated for pressure by a dead-weight apparatus *in situ*, immediately after the diagram is taken, and without stopping the engine. The taking of the diagram and its calibration occupy less than a minute.

Three diagrams are shown in figs. 2, 3, and 4, corresponding to the trials on an orifice $\frac{5}{16}$ inch nominal diameter at the three speeds 52, 140, and 240 revolutions per minute. Each diagram was calibrated *in situ* for intervals of pressure of 5 lbs. per square inch. All the pressure lines shown on the diagrams were put on optically by means of the apparatus mentioned at the time the diagram was taken. In each diagram the stop comes into action when the pressure has reached about 15 lbs. per square inch.

The vertical lines correspond to crank positions of 200° and 220° reckoned from the dead-point most remote from the crank-shaft, or of 20° and 40° reckoned from the nearest dead-point. They are drawn optically at the time of taking the diagram. The diagrams shown in the figures are just as they left the indicator; nothing having been added to them by hand except the lettering.

Measurement of the Temperature.

The engine is fitted with the apparatus described in a paper on "The Measurement of Temperatures in the Cylinder of a Gas-Engine," communicated by Messrs. Callendar and Dalby to the Royal Society in 1907,* by means of which a direct observation of the temperature can be made at any assigned crank-angle with a Callendar platinum thermometer. Briefly, the platinum thermometer is introduced into the cylinder through the stem of the admission-valve, which is bored out to receive it. A percussion contact of novel design is placed on the cam-shaft, so that the thermometer circuit is momentarily closed at any crank-angle desired. The duration of contact was in the present case limited to 10° of crank-angle. The temperature measured is therefore the average temperature over the interval that corresponds to 10° of crank-angle; the crank-angle corresponding to the middle of this interval being the particular angle held to correspond with the temperature observed. The temperature is measured at 0°, 200°, and 220°, reckoning from the dead-centre remote from the crank-shaft. The temperature used for computing W is that measured at 200°, because there the actual temperature is not greatly different from the incoming air in which the thermometer is immersed during the suction stroke, and the rate of change of the temperature is small, and also—what is equally as important—the gas temperature is approximately the same as the wall temperature.

Valve-Setting.

To obtain an accurate calibration of the orifice, it is obvious that all the air entering the cylinder when the engine is driven as a pump must pass through the orifice. With the ordinary setting of the valves, and at slow speeds especially, a small amount of air is likely to be drawn in through the exhaust-pipe, since the exhaust-valve is usually set so that it does not close till a certain fraction of the suction stroke has been performed. Also the admission-valve is set ordinarily so as to open before the exhaust stroke has finished. There is therefore, with the normal valve-setting, a period during which the admission-valve and the exhaust-valve are open together, and the piston passes through the dead-point remote from the crank-shaft during this period. In order to secure that there shall be a definite weight of air in the clearance space when the piston passes the dead-point, and also that all the air coming into the cylinder comes through the admission valve, and therefore through the orifice, the admission valve was reset so that it closed when the crank was 5° over the dead-centre, and the exhaust-valve was reset so that it closed 5° before the dead-centre. It follows from this that the small amount of air in the cylinder when the exhaust-valve is closed is slightly compressed in the clearance space, and that it expands again until the admission valve is open. This small compression and expansion is shown on all the diagrams at the point A. The point A therefore corresponds to a definite weight of air w, which is calculated from the P V and T observed at the point.

The setting of the admission-valve carries with it the consequence that it closes when the crank is about 25° from the end of the suction stroke. Consequently a small expansion of the air in the cylinder takes place, until the piston arrives at the dead-point, on the turn of which compression begins. This expansion towards the end of the suction line can be seen on all the diagrams. The setting therefore ensures that the measurement of the pressure, volume, and temperature takes place well after the closing of the admission-valve, and therefore corresponds to a definite weight of air in the cylinder.

Experiments on an Orifice $\frac{5}{16}$-Inch Nominal Diameter.

The indicator cards from which the measurements of pressure were made are shown in figs. 2, 3, and 4; and particulars of the measurements are given in Table I. The measurement is made direct from the negative by means of a Zeiss glass rule. The pressures given in the table are those corresponding to the 0° and 200° crank-angle position. Full particulars are given in Table I. as to the way in which W is computed, and in Table II. of the

* See "Journal," Vol. CI., p. 34.

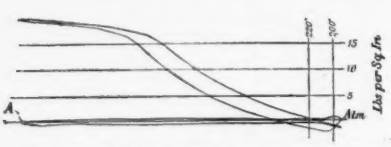


Fig. 2—52 Revolutions per Minute.

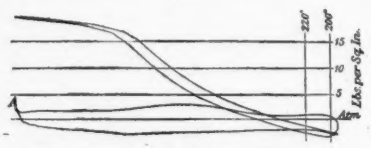


Fig. 3—140 Revolutions per Minute.

Fig. 4—240 Revolutions per Minute.

calculations for the coefficient α. It will be noticed from the latter table that α remains practically constant for the three speeds at nearly 0·6.

TABLE I.—*Details of the Observations from which* W *of Equation* 1 *is Calculated.*

N, Speed. Revolutions per Minute.	Crank Angle. Degrees.	Pressure Measured from Diagram. Pounds per Square Inch.	Calculated Volume. Cubic Feet.	Temperature Measured Directly Deg. C. Absolute.	$\frac{PV}{0{\cdot}665\,T}$ Weight of Air in Pounds.	$\{w_1 - w\}$ Weight of Air Drawn into Cylinder through Orifice per Cycle.	W of Equation 1. $\frac{N}{120}\{w_1 - w\}$ lb. of Air Flowing through Orifice per Second.
52	0	15·40	·0824	287·8	·00663 = w		
	200	13·72	·3872	293·8	·02719 = w_1	0·2056	·00891
140	0	16·75	·0824	306·9	·00676 = w		
	200	11·97	·3872	294·6	·02366 = w_1	·01690	·01972
240	0	20·23	·0824	329·2	·00762 = w		
	200	10·27	·3872	296·4	·0202 = w_1	·01258	·02516

TABLE II.—*Details of the Observation from which* α *is Found.*

Speed. Revolutions per Minute.	Barometric Pressure. Pounds per Square Inch.	Temperature of Laboratory Measured near Entry to Orifice. Deg. C. Absolute.	D, Density of Air. Pounds per Cubic Foot.	h, Head in Feet.	A, Area of Orifice. Square Inches.	α
52	14·67	292·5	·0755	0·180	·306	·597
140	14·67	292·5	·0755	0·885	·306	·596
240	14·67	293·5	·0752	1·505	·306	·584

TABLE III.—*Summary of Experiments on Orifices* 1*-inch and* $\frac{5}{8}$*-inch Nominal Diameters.*

Actual Diameter of Orifice in Inches.	A, Area in Square Inches.	N, Speed, Revolutions per Minute.	h, Head in Feet.	Coefficient α.
1·014	0·807	132	0·160	0·590
1·014	0·807	200	0·230	0·620
1·014	0·807	240	0·285	0·610
0·624	0·306	52	0·180	0·597
0·624	0·306	140	0·885	0·596
0·624	0·306	240	1·505	0·584

CONCLUSION.

It is remarkable that the coefficient remains practically constant over a wide range of speed and over a range of head from 0·18 to 1·5. It would seem, therefore, that if an orifice is so chosen that at normal speed the head in the U-tube is about 1 foot, the air supply can be calculated without serious error by using a coefficient of which the value is 0·6. The weight of air (W) in pounds per second would then be given by the expression

$$W = \tfrac{1}{4} A \sqrt{sh\,D},$$

where A is the area of the orifice in square inches,

s is the specific gravity of the liquid in the U-tube,

h is the difference of level in the U-tube measured in feet,

D is the density of air entering the orifice in pounds per cubic foot.

D is to be calculated from P ÷ 0·665 T, where P is the barometric pressure in pounds per square inch, and T is the absolute temperature in degrees C. of the air at the entry to the orifice.

From this it would appear that the rate at which gas is supplied to the engine could be measured in the same way with probably greater accuracy than is possible with the ordinary wet meter. The chamber, relatively large, could be arranged on the side of the gas-bag remote from the engine, divided into two parts by a diaphragm, in the centre of which is an orifice of such diameter that the difference of head between the two sides of the diaphragm would correspond to about 1 foot of water. I may say that I am making one of these, and will give some particulars of the results in a future communication. With the large difference of level in the U-tubes adopted, very small variations in the supply can be detected; and the difference of level may be almost used for a speed indicator.

Finally, I think that this method may be used in any case in which the air supply is to be measured directly, since the above experiments show that, with proper precautions, the coefficient α may be regarded as sensibly constant over a wide range of speed and head.

Copper sulphate to prevent algæ was used in four of the reservoirs at the Albany (U.S.A.) Water-Works last year, before the commencement of warm weather. Two of the basins were treated four times during the season, another three times, and another twice. The maximum amount of sulphate used during any one application was 0·32 part per million, and the minimum quantity 0·1 part per million. The early start made with this treatment and the constant watching for the development of aquatic growths are the reasons given by Mr. H. J. Deutschbein, of the Bureau of Water, to account for the fact that no complaints regarding algæ were received during the year. The reservoirs are supplied with filtered water from the Hudson River.

REGISTER OF PATENTS.

APPLICATIONS FOR LETTERS PATENT.

23,348.—HART, J. A., "Compression of gas." Oct. 8.

23,355.—PINCHING, E. L., and WALTON, W. H., "Illumination devices." Oct. 8.

23,369.—SCHWABACHER, H., "Lamplighters' torches." Oct. 8.

23,376.—MOORE, W. G., "Treatment of carbonaceous materials and their bye-products. Oct. 10.

23,406.—BOURNE, J. J., "Pneumatic operator for gas-taps." Oct. 10.

23,448.—GUNNING, J., "Lighting and extinguishing gas-burners at predetermined hours." A communication from Couaillet Frères. Oct. 10.

23,476.—CANNON, D. W., "Incandescent burners." Oct. 10.

23,488.—SOUTHEY, A. W., "Generation of gas." Oct. 11.

23,492.—BURSTALL, F. W., "Washing and scrubbing gases." Oct. 11.

23,495.—M'FARLANE, A. & A., "Magnifier of gaslight." Oct. 11.

23,521.—MACLAGGAN, R., "Galleries for globes." Oct. 11.

23,549.—HUTCHINS, T. W. S., "Gas-producers." Oct. 11.

23,550.—AARTS, J. G., "Retorts." Oct. 11.

23,559.—FRÄMBS, H., and BENDER AND FRÄMBS, G.M.B.H., "Gas-producers." Oct. 11.

23,589 —HALL, E. J., and STEVENSON, H., AND SONS, LTD., "Boxes for inverted mantles." Oct. 12.

23 598.—HENNESSY, J. J., and SPENCE, R , "Air-gas apparatus." Oct. 12.

23,666-7 8.—FLAVEL, P. W., "Atmospheric burners." Oct. 12.

23,696.—RUSSELL, W. J., "Gas-stoves." Oct. 12.

23,697.—HASSALL, W., and LINES, A., "Inverted burners." Oct. 13.

23,705.—YARROW AND CO. (BOLTON), LTD., and YARROW, M., "Joints of pipes and mains." Oct. 13.

23,719.—DETMOLD, E., "Inverted mantle." Oct. 13.

23,722.—DEUTSCHE GASGLÜHLICHT AKT.-GES. (AUERGES.), "Incandescent burner." Oct. 13.

23,779.—CHALLIS, J., and STEPHENS, K., "Incandescent burners." Oct. 14.

23,794.—PEARSON, J. S., and WELDING, T. C., "Generating air-gas." Oct. 14.

23,822.—GIORGI, A., "Gas-regulators." Oct. 14.

23,856.—ACETYLENE ILLUMINATING COMPANY, LTD., "Acetylene containers." A communication from Acetylène Dissous et Applications de l'Acetylène." Oct. 14.

23 916.—YATES, H. J., "Thermostats." Oct. 15.

23,926.—DEUTSCHE GASGLÜHLICHT AKT.-GES. (AUERGES.), "Incandescent burners." Oct. 15.

23,929.—ANDERSON, D., "Gas-lamps." Oct. 15.

23,930.—ANDERSON, D., "Gas-controllers." Oct. 15.

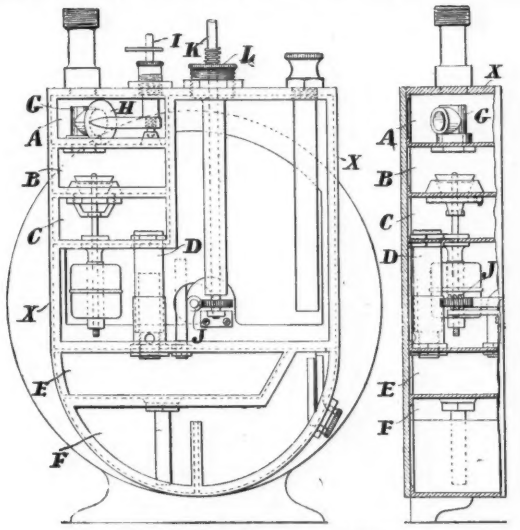
23,948.—STOLTE, A., "Gas-washer." Oct. 15.

Coin-Freed Wet Gas-Meters.

SUTHERLAND, J. C., of Erdington.

No. 22,050; Sept. 28, 1909.

A feature of the present invention is to form all the necessary small chambers integral with the larger chamber casting, so as to be accessible by the simple removal of the front plate. Further, separate chambers are provided for the automatic valve and the float valve; these chambers having beneath them an additional chamber forming a gas-way from the float valve chamber to the overflow chamber.



Sutherland's Coin-Freed Wet Meter.

In the elevation with front plate removed and side elevation with part broken away to show the various chambers in section, the automatic valve chamber A is immediately over the float valve chamber B, below which is an additional chamber C with outlet tube D leading to a compartment E below the shelf, and which compartment communicates with the measuring drum M and with the waste-water box F, which is fitted with a transverse vertical partition to prevent unregistered gas being withdrawn from the syphon overflow.

The chambers A, B, C are cast in one piece with the chamber casting X, and so formed that when the front plate is removed the chambers

are completely accessible, as are also the compartment E and the waste-water box F.

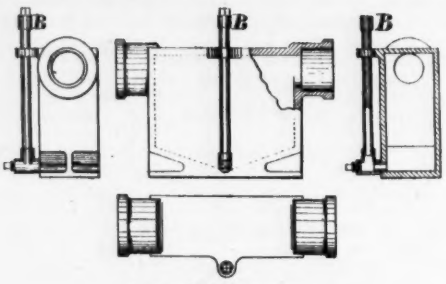
Screwed into the floor of the chamber A is an elbow pipe G, in the horizontal branch of which is the seating for the automatic cut-off valve H. This valve is operated by the vertical shaft I extending upwards through a stuffing box in the casting, and working in conjunction with the compound screw (not shown) usual in prepayment attachments to set the valve for the consumption of a definite quantity of gas on the insertion of a given coin in the prepayment mechanism. On rotation of the measuring drum M of the meter, the worm J on the drum shaft actuating the index-shaft K restores the valve to its initial position by means of suitable gearing, and thereby cuts off the supply of gas from the measuring drum. The index-shaft K passes through a stuffing box L, provided with packing leathers "which effectively prevent leakage of gas, even at very considerable pressures."

Syphons for Collecting and Removing Liquid in Gas-Mains.

LAYTON, A. E., of Redditch.

No. 22,965; Oct. 8, 1909.

This invention relates to syphons or catch boxes in the form of a rectangular casting; the base of the well being inclined so that the liquid flows to the lowest point, where the pump pipe enters at right angles, and passes down to the junction outside the syphon. At the bottom of the syphon (communicating with the lowest part of the well) is an inverted T-piece; the pump tube entering its vertical limb. The inner horizontal limb communicates with the well; while the outer one has a screw plug, by removing which the syphon may be flushed for the removal of dirt or sediment.



Layton's Pipe Syphon.

As illustrated, the syphon has a depending well part; and the interior is inclined so as to cause the liquid to flow to one part. There are two inclines shown, meeting at the centre, at which point the pump tube enters; but, if desired, there may be a single incline falling to one end of the well, or the well may be inclined transversely or so arranged that the liquid will flow down to a lowest point.

The pump tube B is arranged outside the syphon; being held at the top by a lug and at the bottom by an inverted T-piece, one limb of which enters the well at its lowest point. After removing the plug, the pump may be attached and the liquid pumped out in the usual way; while the plug enables the syphon to be flushed for the removal of dirt or sediment.

Discharging and Charging Machine for Gas-Retorts.

WEST, J., of Southport.

No. 22,471; Oct. 2, 1909.

This gas-retort discharging and charging machine is in general description, and the object to be achieved, similar to that described in patent No. 9673 of 1908; and it has for its object "to discharge the coke from the gas-retorts by pushing the coke through the retort by means of a ram constructed in the form of a scoop and operated by a chain, whereby the coke is discharged from the retort, and the coal fed into the retort at the same time—the coal being deposited and left in the retort when the scoop is withdrawn from the retort."

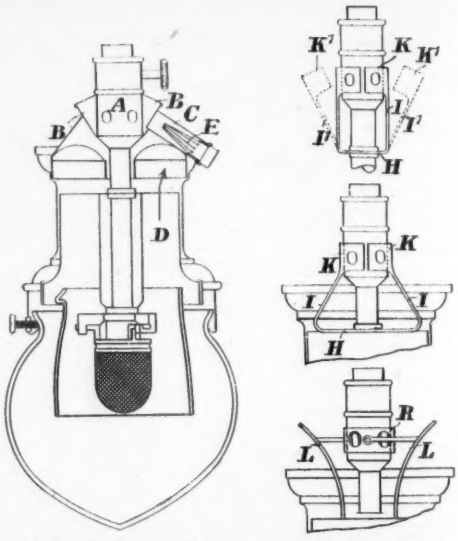
An illustrated description of the arrangement appeared in the "JOURNAL" for April 5 last (pp. 24-26), and little need now be added, except to reproduce a side and end elevation of the machine (from the drawings accompanying the patent specification), so as to show the modification made since the earlier arrangement referred to above. For an illustrated abstract of the 1908 patent, see "JOURNAL" for May 18, 1909, pp. 450-51.

Bunsen Burner with Automatic Air Regulation.

GESELLSCHAFT FÜR VERWERTUNG CHEMISCHER PRODUKTE MIT BESCHRÄNKTER HAFTUNG, of Berlin.

No. 27,344; Nov. 24, 1909. Date claimed under International Convention, Feb. 2, 1909.

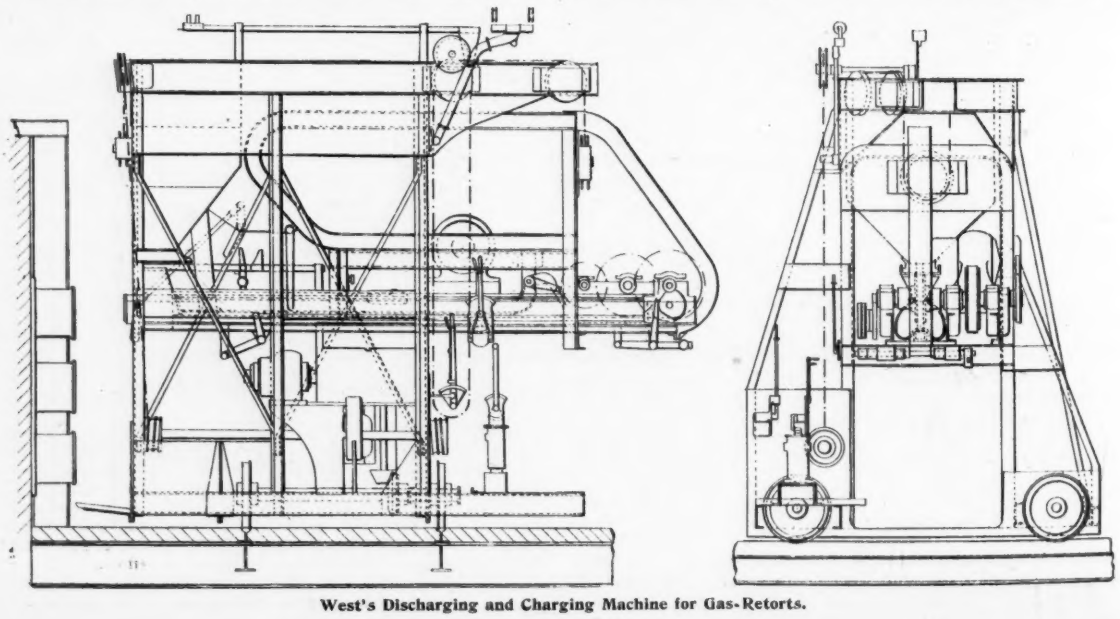
This invention relates to a bunsen burner in which the air supply is automatically regulated by means of one or more thermostatic bodies—being characterized by the attachment of the expanding body or bodies outside the reach of the suction-chamber, so that when the burner is cold the air apertures of the suction chamber are closed, and the explosion flame produced when the lamp is lit cannot strike into it.



A German Burner with Automatic Air Regulation.

In the inverted burner shown complete, the suction-chamber A is surrounded by a chamber B, from which air supply pipes C lead outwards. These pipes are exposed to the products of combustion flowing from below (in the direction of the arrows) and coursing from the chimney D. Within they are fitted with a piece E, consisting of two plates of metal of different co-efficient of expansion—say, brass and iron—closely united by rolling. When cold, this regulating piece in its upper part forms a cone consisting of several tongues. When the burner is lit, the rising products of combustion heat the tube C and the thermostat therein; and the shape of the latter is so altered that the several tongues bend away from one another and free the transverse section of the pipe for the primary air of the burner.

In the first modification, the valves K surround the suction-chamber and the air admission apertures thereon. They are attached to strips



West's Discharging and Charging Machine for Gas-Retorts.

of sheet-metal connected with one another by a bridge-piece H—made of thermostatic metals. It is essential that the expanding material is not mounted on the suction-chamber but on the lower part of the burner-tube, which is always more strongly heated than the suction-chamber, so that it may be exposed to sufficient heat. When the lamp is lit, the valves K move (by reason of the expansion parts I and H being heated) and assume the positions K^1; while when the lamp is extinguished, the valves resume their former position in which they close the air-apertures.

The other modification differs in that the bridge-piece H is made wider, so as to obtain a better surface for contact with the lamp casing and better transmission of heat to the thermostat.

In the third construction shown, the conducting pieces L are so constructed as to be expanding, and are suitably coupled with the annular slide R. As the ascending products of combustion pass the conducting pieces, the latter alter their shape and produce the requisite movement of the slide.

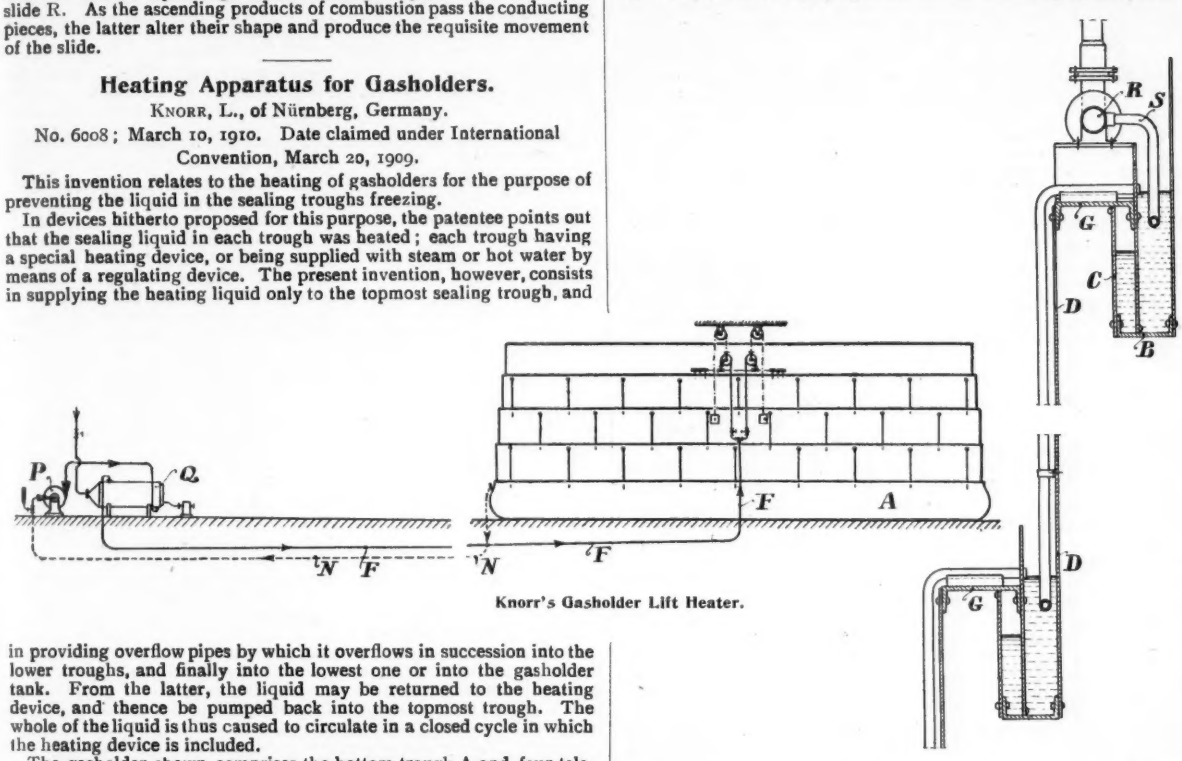
Heating Apparatus for Gasholders.

KNORR, L., of Nürnberg, Germany.

No. 6008; March 10, 1910. Date claimed under International Convention, March 20, 1909.

This invention relates to the heating of gasholders for the purpose of preventing the liquid in the sealing troughs freezing.

In devices hitherto proposed for this purpose, the patentee points out that the sealing liquid in each trough was heated; each trough having a special heating device, or being supplied with steam or hot water by means of a regulating device. The present invention, however, consists in supplying the heating liquid only to the topmost sealing trough, and in providing overflow pipes by which it overflows in succession into the lower troughs, and finally into the lowest one or into the gasholder tank. From the latter, the liquid may be returned to the heating device, and thence be pumped back into the topmost trough. The whole of the liquid is thus caused to circulate in a closed cycle in which the heating device is included.



Knorr's Gasholder Lift Heater.

The gasholder shown comprises the bottom trough A and four telescoping annular sections above—the latter carrying the roof (not shown) of the holder. The heating liquid is supplied by the pipe F. To this pipe are connected two flexible pipes led over pulleys into the topmost sealing trough that connects the two upper gasholder sections. The pulleys are suspended from tensile members which pass over pulleys attached to the gasholder framing (not shown), and which carry weights at their other ends, so that the flexible pipes are kept taut. The excess of the sealing liquid overflows from the topmost sealing trough by an overflow pipe into the next lower sealing trough, and thence similarly through overflow pipes until it reaches the bottom trough A. From A, the liquid is drawn through the pipe N by the pump P, and forced thence, through the heating device Q and the pipe F, back to the topmost trough.

In the sectional drawing, the side of the topmost telescoping section of the holder is formed by an annular U-member B riveted to the side and by the ring C. The next lower telescoping section D carries at its upper end an annular U-member G, to which a ring is riveted that dips into the sealing liquid. R is a circular pipe to receive the heating liquid from a flexible pipe above and deliver it, through a number of pipes S distributed over the entire circumference of the sealing trough, into the latter. If the sealing liquid rises beyond a determined level, it overflows through pipes into the next lower sealing trough, whence it will be conveyed, through further overflow pipes, into the next lower sealing trough, and so on.

Separating Tar from Hot Gas Produced in the Destructive Distillation of Coal.

WAGENER, E., of Dahlhausen a.d. Ruhr, Germany.

No. 6282; March 12, 1910. Date claimed under International Convention, March 29, 1909.

This invention "consists in subjecting the gas to centrifugal action while the tar or mixture of tar and ammoniacal liquor, separated from gas in a previous operation, is injected in large proportion into the gas, or in mixing the gas with tar or a mixture of tar and ammoniacal liquor before it is subjected to the centrifugal action."

The patentee states that he founds his invention on the following considerations: Tar has been removed from the hot gas produced in the destructive distillation of coal by subjecting the gas to a spray of tar forced through an injector; the tar used as a scrubbing agent being kept at a temperature not exceeding 80° C. It has also been proposed to remove the tar from the hot gas by passing it in a vertical direction through a horizontally distributed fine spray of tar already separated or in the act of being separated. It has also been proposed to subject the hot gas to centrifugal action for separating the tar, at a temperature which prevents the condensation of the steam contained in it. Of these methods, the first has proved very valuable, because, by the use of a sufficient proportion of the scrubbing agent, an intimate intermixture of gas and agent is obtained; and only in this manner can the fine tar drops be completely absorbed. The fact that in gas-works the rotary exhauster used for moving the gases separates tar even from cool (almost tar-free) gas, shows that centrifugal appliances are suitable for separating tar. For removing the large proportion of tar in crude gas, the tar as it separates does not suffice; but a larger quantity of previously separated tar must be introduced into the scrubbing apparatus in order that removal of tar may be complete.

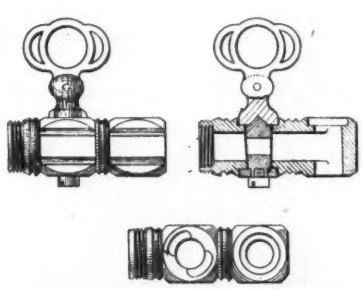
He has found that, even when a tar spray is used, it is advantageous to inject tar into the gas before it arrives at the tar spray (as is shown in patent No. 12,809 of 1908), because there is produced an intimate mixture of the gas and tar before they pass together through the injector. The use of a large proportion of the scrubbing agent offers the further advantage that, in order to cool the crude gas to the suitable scrubbing temperature, no separate cooling agent is required. The scrubbing agent itself effects the cooling; since, owing to its high specific heat, an increase of its temperature by only a few degrees means a considerable reduction of the temperature of the crude gas—especially since at these temperatures there is no condensation of steam to water; the gas being still superheated.

Taps or Cocks for Gas.

SPERRYN, G., and WOOD, W. H., of Birmingham.

No. 6950; March 19, 1910.

This invention refers more particularly to taps or cocks used for regulating and controlling the supply of gas to burners; the object being to provide a positive "stop" or "nighting" "possessing none of the defects of the hitherto known methods of providing stops on taps."



Sperryn and Wood's Gas-Tap.

The inventors form the thumb-piece or fan separate from the plug, and provide projections at the bottom of it. The thumb-piece is secured in a slot or bifurcation in the plug, so that the projections are presented from the sides of the slot; and stops engage these projections or horns by cutting away the top of the tap body. The thumb-piece is preferably stamped from sheet metal with a bottom part wider than the top of the plug, which is slotted to receive it. The bottom part of the thumb-piece thus projects on each side of the top of the tap-plug and forms the horns or projections.

The invention will be understood by referring to the illustration.

Recovering Valuable Products from Iron Pickling Liquor and Gas Liquor.

FALDING, F. J., of New York, and CATHCART, W. R., of New Jersey, U.S.A.

No. 11,364; May 7, 1910.

This invention relates to a process for making sulphate and chloride of ammonia, or other salts of ammonia, and recovering the valuable products from the waste pickling liquor resulting from the washing of iron and steel in a weak acid solution, and from the gas liquor resulting from the washing or scrubbing with water of gas produced by the distillation of coal and other organic matter.

The process consists in mixing the pickling liquor with the gas liquor to form an ammonium salt—such as ammonium sulphate in solution and iron hydrate, subjecting the mixture to the action of an oxidizing agent to convert the soluble iron hydrate into iron hydrate (which is insoluble in the presence of the ammonium salt) and thereby causing all the iron to precipitate, and preferably separating the precipitate from the solution and recovering the ammonium salt from the solution.

Describing the invention more in detail, the patentees say: Supposing the waste pickling liquor employed to be in the sulphate form. If ammonia (NH_3) is added to a solution of ferrous sulphate, the following reaction will take place:

(1) $2NH_4OH$ (or $2NH_3 + 2H_2O$) + $FeSO_4 = (NH_4)_2SO_4 + Fe(OH)_2$.

The ammonium sulphate will remain in solution and the ferrous hydrate will be only partly precipitated—it being soluble in the presence of the ammonium salt. If the solution is subjected to the action of an oxidizing agent, as by passing a current of air through it while heated, the ferrous hydrate will be converted into ferric hydrate or some intermediate oxidation product or a mixture of such products, for example—

(2) $2Fe(OH)_2 + H_2O + O = Fe_2(OH)_6$ and
$3Fe(OH)_2 + O = Fe_3O_2(OH)_4 + H_2O$.

These ferric and ferroso-ferric hydrates are insoluble in the presence of ammonium salts, and therefore precipitate completely.

The gas liquor is preferably given a preliminary treatment in order to free it from sulphides. For this purpose there is added to a given volume of gas liquor sufficient of the pickling liquor to produce enough ferric or ferrous hydroxide to precipitate the sulphur as iron sulphide and free sulphur. Instead of the pickling liquor, ferrous hydroxide (or preferably ferric hydroxide, previously obtained by this process or otherwise) may be used for this purpose. This step of the process may be carried out either with or without heat and oxidation as may be necessary, and according to the solution of iron salt employed. The precipitate will carry down some of the tarry matters of the gas liquor, and the cyanogen and chlorine compounds contained in the gas liquor will be precipitated. The precipitate may be further treated for recovering the sulphur and cyanogen and chlorine values, together with iron hydroxide.

To the volume of gas liquor now freed from sulphides, cyanide, and chlorides, a corresponding volume of the waste pickling liquor containing the necessary equivalent of sulphuric acid to combine with the ammonia contained in the gas liquor is added; and the mixed solution is preferably oxidized by heating it and passing a current of air through it, or in any other suitable manner. There will thus be produced ammonium sulphate in solution, which can be recovered in the usual way, and a precipitate of insoluble iron hydroxide, which will be practically free from sulphur, as also from cyanide and chloride, which may be washed and filter-pressed and prepared for use as an iron ore or otherwise.

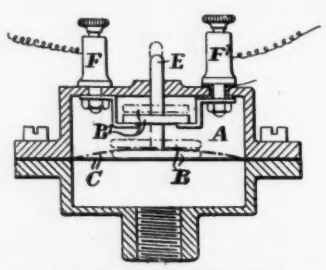
In order that all of the iron may be precipitated as hydrate, it will be evident that the solution should at all times be slightly alkaline, a slight excess of gas liquor being used for this purpose. The patentees add: The foregoing process can be used to advantage where the gas liquor and pickling liquor are produced in plants situated some distance from each other.

Gas-Pressure Alarm Apparatus.

TRIMLETT, H. J., of Wandsworth Road, S.W.

No. 17,712; July 26, 1910.

This device, to be used for the purpose of giving an alarm when the pressure of gas in a pipe falls below a predetermined point (especially intended for use with incubators), consists of a casing dividing into two chambers by a thin diaphragm of indiarubber or like material; the lower chamber having a tapped boss by which it is secured to the gas-pipe.



Trimlett's Gas-Pressure Alarum.

As shown, the upper chamber A receives the movable contact maker consisting of the rod E, which passes loosely through a hole in the top of the casing, the disc B resting a little distance above the diaphragm C. The two terminals F and F^1 are connected to the alarm circuit and carry internal contact pieces at their inner ends. The terminal F^1 is insulated from the casing by an insulating thimble, so that the circuit is not completed unless the contact disc B^1 drops upon the contacts as shown in full lines. The whole device is secured upon the gas-pipe by the tapped boss of the lower chamber so that the under side of the diaphragm C is subjected to the gas pressure, which normally pushes it up, as shown in chain lines, raising the contact maker clear of the contacts.

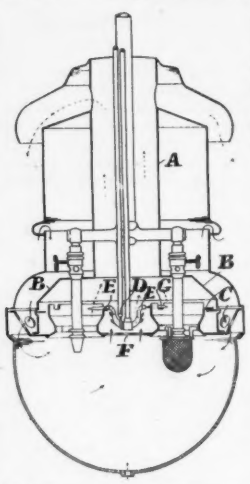
This device may be used in greenhouses warmed by gas, or for house supply through a slot meter, to call attention immediately the pressure of the gas begins to decrease.

Ignition Device for Inverted Incandescent Gas-Lamps.

JULIUS PINTSCH, AKTIENGESELLSCHAFT, of Berlin.

No. 14,492; June 15, 1910. Date claimed under International Convention, June 16, 1909.

In inverted gas-lamps of this kind, in which the combustion gases are not led off through a central chimney, the patentees point out that no difficulty exists in arranging the ignition device outside the area of the combustion gases, "since in these lamps generally a cover is provided over the main flame, above which the ignition device can be arranged." In inverted gas-lamps with central chimney, however, the ignition device has hitherto always been arranged in the chimney itself, or, at least, in such a manner that the combustion gases, when flowing to the chimney, traversed or passed the ignition device—in consequence of which, not only a deposit of soot, but also the destruction of the ignition device by the hot combustion gases resulted.



Pintsch's Ignition Device for Incandescent Gas-Burners.

According to this invention, the ignition flame device is within a space formed by the mantle-holders and perfectly closed off from the combustion gases. The space can thus receive fresh air from below, and the ignition flames pass through holes provided in the mantle-holders into the area of the gases issuing from the main burners.

The chimney A has at its lower part a chamber B common to the burners, in which a supporting ring for the mantle-holders is fixed. The combustion gases of the main burners are led through the mantle-holder C into the chimney, and flow into the atmosphere in the direction of the dotted arrows, whereas the path of the fresh air is illustrated by arrows drawn in full lines. The burners for the pilot flame D and the travelling flames E are arranged within the chamber B, in such manner that they lie below the upper edges of the mantle-holders, and are protected against the combustion gases by the suction action of the chimney carrying the gases upwardly. In order to increase this suction action, small holes F are arranged within the reflector below the pilot burners, which allow of the entrance of the fresh air to the pilot flames. In order to effect ignition by the travelling flames, the pipes of the traveller are constructed so that the flames pass through openings G of the mantle-holder into the interior of the holders. In this manner the pilot flame and travelling flame are arranged outside of the space filled with the combustion gases, and are "protected against an undue influence of the heat."

Bristol Electricity Undertaking.

Speaking at a Bristol ward meeting, Councillor Featherstone Witty devoted a considerable part of his address to criticism of the Corporation electrical undertaking. Referring to a statement that the competition of the electric light had caused reductions in the price of gas, he said that the capital expenditure on the undertaking was £821,000; and if the municipal traders were content with having a reduction in the price of gas for this sum, then all he could say was that £821,000 was a big price to pay for what would no doubt have come about even if such an undertaking had never existed. The statements of the municipal traders meant that the lower the price of electricity was brought, the lower would be the price of gas. On this principle, how much they would benefit the consumers of gas if the Corporation were to provide electricity free! He urged, however, that the reduction in the cost of gas had been brought about by questions quite apart from the electricity undertaking. The price for the electric light had never been low enough to come into such sharp competition with gas as to cause a reduction in the price. What he wanted to emphasize was the new doctrine on which the municipal traders were falling back—that the electrical concern was not run for the benefit of the ratepayers as a whole, but for the benefit of consumers of gas, and in order that these might have their gas bills reduced. If his opponents could show conclusively to the ratepayers of the city that his contentions had no foundation on fact in regard to the sinking fund being insufficient of itself, without something added to it every year, for the depreciation of the assets of the electrical concern, and that it did not wipe off a penny of real debt—if they could prove that his statements were entirely and absolutely erroneous, he would give a hundred guineas to the General Hospital and the Royal Infirmary, on condition that if he was right, and they were wrong, they would act in a similar manner.

We are informed that Messrs. R. & A. Main, Limited, have appointed the following additional representatives: Mr. David Gibb, North of England; Mr. S. F. Chamberlain, Eastern Counties; and Mr. C. G. Clark, Eastern Central Division of England.

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CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Mansfield's Inverted Burners.

SIR,—In the current issue of the "JOURNAL" appears a reference to some proposals for improvements in inverted incandescent burners, which form the subject of a patent granted to Mr. Alfred Mansfield, bearing the date of Aug. 31, 1910.

The patent not being at present in print, I have to rely upon the abstract of it appearing in the "JOURNAL." But from this it seems that the methods proposed by Mr. Mansfield bear a very strong likeness to those used in the burners which were adopted for street lighting by the Beckenham Borough Council in competition with their own electric lighting. The size of these burners was carefully proportioned to suit the South Suburban Company's gas; and there is no method of adjustment either with the air or the gas—both are predetermined, and beyond the power of the lamplighter to alter. The system was the same one as that previously applied to the South Metropolitan Company's area, where some thousands of the burners, also specially proportioned, are in successful use. We have also applied the same methods in burners used for indoor lighting, of which considerable numbers have been made.

I believe Mr. Mansfield is on the right lines in his endeavours to construct a burner which relies upon fixed dimensions for efficient working; but I do not think he can claim originality in this. We have had burners in use for more than twelve months, with consumptions commencing at 1¼ cubic feet per hour, constructed with fixed dimensions; and they have proved themselves, and are in my opinion, a great improvement over the various variable types.

CHARLES CARPENTER.

South Metropolitan Gas Company,
Oct. 20, 1910.

The Testing of Gas-Fires.

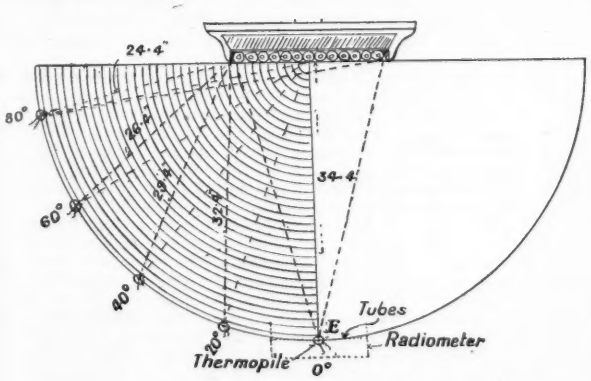
SIR,—I was pleased to see Mr. Clark's letter in your issue of the 18th inst., referring to mine of the 11th inst. It does not, however, dispose of my contention that the thermopile and galvanometer, as at present operated, lead to considerable error in the ascertainment of the radiation efficiency of gas-fires, especially very wide ones.

Perhaps it will be as well, before entering into the subject, to dispose of the points given by your correspondent as being those most likely to cause the error to which I refer. They are:

(1) Error due to the conical hood of the thermopile.
(2) The true centre of the thermopile.
(3) The elimination of error due to the conduction of heat into the radiometer from the warm surrounding air.

The conical hood I disposed of nearly three years ago, as I found (in repeating experiments with all conditions constant) that the total galvanometer readings differed considerably (these tests were comparative only). Without the hood, I got lower but much more consistent readings. Latterly, I have employed means that enable me to set the thermopile facing central in each position on the hemisphere; so that in two or three consecutive tests the total readings agree to within 2 per cent.

I take the centre of the thermopile as being the true centre; and at the distance of 34·4 inches (being *minus* hood), practically no rays are obstructed. There is further the advantage of obtaining lower readings on the galvanometer by the removal of the hood, inasmuch as owing to the torsion of the hair-springs on which the needle of the galvanometer is pivoted increasing the further the needle moves up the scale, a greater current of electricity is necessary to move the needle through (say) from 50 to 60 than from 1 to 10. Therefore, by keeping the deflections of the needle as low as possible, one is more likely to get readings in proportion to the intensity of the rays. A moment's reflection will, I think, make this quite clear to the reader, without any elaboration on my part.



The last point—viz., "Error of conduction of heat, &c."—I allow for as follows: The radiometer is placed so that its front is facing away from the fire; the tubes or face proper being left exposed to the air of the laboratory. A light cloth is thrown over the side exposed to the radiations of the fire. The water is then set running; the fire lighted; and the whole left to reach the maximum. By regulating the ventilation, the laboratory is maintained at almost constant temperature; so that after noting the difference in the levels of the thermometers due to the warm air of the laboratory (and which is deducted from the total rise), the radiometer is placed into position and the whole test carried out under fixed conditions. I could mention other necessary precautions, but think that enough has been said to show that due regard is paid to these measures.

To return, however, to the point in question. I attach herewith a diagram on which I have marked the distance of 34·4 inches from the face of the fire to the thermopile as lines, each line representing an inch. Taking a fire (say) 20 inches wide, and placing the thermopile at E, it is in this position 34·4 inches from the face of the fire. Not so, however, if we place it at 20°; for at this point the source of some of the rays is approximately between 34·4 inches and 32·4 inches; at 40°, between 34·4 inches and 29·4 inches; at 60°, between 34·4 inches and 26·4 inches; and at 80°, between 34·4 inches and as low as 24·4 inches. By extending the width of the fire, this figure would be reduced considerably more, with, of course, a consequent rise of the galvanometer readings. From tests I have made with specially prepared fires, I find that although the reading on the galvanometer when the thermopile is at E equals only 18, yet when it is placed at the 80° mark the reading jumps to as high as 60. These readings, when dealt with in the usual manner, give utterly absurd results. The same objections apply to even the smallest of fires, though, of course, not to such an extent.

I am now engaged upon altering my apparatus to procure if possible the true efficiency of even the widest fires marketable.

EXPERIMENTER.

Oct. 23, 1910.

Automatic Lighting and Extinguishing Public Lamps.

SIR,—May I once more trespass on your space to reply to the further criticisms of your correspondent who signs himself "Contributor," and at the same time explain that, in so doing, I have no intention of booming any individual lighter, but simply to point out where the criticisms are not valid or correct.

With reference to the difference which exists between the class of pressure apparatus which utilizes the whole of the pressure for operating and the class which relies for the purpose upon the margin over and above the maximum day pressure—admitting that "the difference is only one of degree"—my point was that it was just this degree which destroyed the validity of "Contributor's" first premise that the former class of apparatus is useless with low pressures. This is amply borne out by his further statement that, to work the second class of apparatus with anything like safety, it is necessary to permit it to engage at the maximum working day pressure, and then raise the pressure 1½ inches to operate it—*i.e.*, 1 inch for the range and ½ inch for the safety margin—so that only in the case of a gas-works having an abundant reserve of pressure can the ordinary pressure lighter be used with any degree of reliability.

Dealing with what may be termed the "whole pressure" type of apparatus, "Contributor" gives us a very nice equation. He says: If x equals the pressure necessary to raise the bell, and l equals the pressure required to turn the tap with a margin of safety, therefore $x\ l$ is the pressure below which this class of apparatus will not work. This is undoubtedly true. But he is still leaving $x\ l$ an unknown quantity; and while this force remains unknown, it is merely playing with words to state that there are plenty of gas-works in this country and on the Continent that work with pressures below $x\ l$.

One cannot argue with or against nebulous quantities. The modern tendency of the gas industry is (owing to the almost universal adoption of the incandescent burner) to increase the working pressure; and although in some places low pressures are still the rule, this is only an argument in favour of my contention that the ideal pressure lighter is that which utilizes the whole of the gas pressure, rather than that which relies upon only a portion of it.

To give a concrete case of what is meant. The writer, some years ago, while working on the Continent with a "whole pressure" type of apparatus, obtained perfectly satisfactory results with a total initial pressure (inclusive of the necessary rise given for lighting) of 30 mm.—actually less than the increase over and above the maximum day pressure which, according to "Contributor," has to be given to successfully work the "margin pressure" type of apparatus.

If "Contributor" had followed his own advice, and read my reply carefully, he would no doubt have noticed that, when dealing with the danger of mercury-seal blowing, I did not infer that this never happened, but that there was no chance of it occurring, providing "the apparatus is constructed in a proper manner." And I see no reason to alter this opinion.

There was no misunderstanding on my part, either intentionally or otherwise, *re* the question of mechanically altering the range between the engaging and operating point on the ordinary apparatus, as I had this type also in mind when making the statement that there were methods of achieving the above result. I regret that I cannot share "Contributor's" enthusiasm for the apparatus mentioned by "Eureka," especially as pressure lighters which were able to work at a high pressure and extinguish at a low pressure were tried, condemned, and banished from this country twenty-five years ago. It may be that this type might suit some districts—for instance, towns or villages where the lamps are extinguished at midnight. But they would be absolutely unsuitable for sunrise extinguishing, as this would necessitate the gas company maintaining a comparatively high pressure right through the early hours of the morning—an arrangement entirely opposed to all current practice.

The alternative of extinguishing at a high pressure, which is at the same time lower than that required for lighting, is certainly an improvement; but if this is accomplished by a fixed adjustment, the advantage is exceedingly small compared with what can be, and is being, done in this direction. The only way in which the gas engineer can be provided with an apparatus which will allow him a choice of pressures suitable to the conditions of supply, stock, reserve, pressure, &c., existing at the works (especially as these conditions often vary from day to day) is to completely ignore height of pressure altogether and simply work upon the method of giving same. If an apparatus can be produced which uses the whole of the gas pressure for opening or closing the burner supply, constructed in such a manner that all the working parts are easily accessible and outside the gas supply, and which allows the lighting to be performed at a high pressure and the extinguishing at a second high pressure lower than the first or *vice*

versâ, which will also permit of a drop in pressure and a subsequent sharp return of same, effecting the desired result, I claim a great advance has been made in the question of the lighting of public lamps by automatic means.

This can be done, and is being done to-day, not in an experimental fashion, but over large areas, as all those interested in the question can ascertain for themselves. The above result is achieved by an apparatus which only responds to a sharp increase irrespective of what the initial pressure may be at the time, or how same may vary from day to day; and actual tests have proved that this type of apparatus will respond to a sharp increase of (say) 5-10ths or 6-10ths given at any point between 20-10ths and 62-10ths. The tests were as follows:—

20-10ths to 26-10ths for lighting
26-10ths to 32-10ths for extinguishing
32-10ths to 38-10ths for lighting again
38-10ths to 44-10ths for extinguishing again.

And so on up to the limit mentioned above; and then the pressure was dropped to about three inches, and the cycle was commenced over again.

At the same time a slow rise of three or four inches did not affect the apparatus in any way. This new method of working automatic lighting by pressure gives the widest possible range of pressure under which the apparatus can be relied upon to perform its proper function without the necessity of re-adjusting in any way.

In conclusion, I think the best thanks of the gas industry are due to "Contributor" for raising this very profitable discussion, and also to the "JOURNAL" for throwing open the correspondence columns for this purpose.

Farringdon Avenue, E.C., Oct. 21, 1910. ARTHUR H. FRANCKS.

LEGAL INTELLIGENCE.

GAS COMPANIES AND THE REINSTATEMENT OF ROADS.

Unsuccessful Action against the Rayleigh Gas Company.

In the King's Bench Division of the High Court of Justice last Wednesday, Mr. Justice Bray and a Common Jury had before them the case of *Jarvis and Others v. Rayleigh Gas Company*. It was an action brought, under Lord Campbell's Act, by Mrs. Ellen Jane Jarvis, who, with her six children, sued the Company for damages in consequence of the death of her husband, Walter Jarvis, caused, as alleged, by the negligence of defendants' servants.

The plaintiffs' case was that on Sept. 7, 1909, the deceased was riding a bicycle down the Rayleigh Road where the defendants' workmen had just before dug a trench for laying a main and had filled it up. He came into contact with a flint about the size of a man's hand, and was thrown from his bicycle; sustaining serious injuries, from which he died four days afterwards. The allegation was that the accident was occasioned by the negligence of the defendants' servants in not properly filling in the trench, with the result that the large stone was left upon the road. The defendants admitted that the trench had been filled in by their workmen; but they denied that they or their workmen were guilty of negligence. They also denied that the stone with which the deceased had collided came from the trench, or that it formed any part of the material used by their workmen in filling up the hole—saying it had been employed to scotch the wheel of a cart going uphill. They also alleged contributory negligence on the part of the deceased, inasmuch as he was riding with a parcel so placed that he could not properly guide or control the machine.

Mr. J. Duncan appeared for the plaintiffs; Mr. Marshall Hall, K.C., and Mr. Morton Smith represented the defendants.

Among the witnesses called for the defence were Mr. Worthington Church, the owner of the works, and the Manager (Mr. J. A. Kent); and at the close of the evidence his Lordship left the four following questions to the Jury: (1) Were the defendants guilty of negligence in filling up the trench? (2) Was the stone lying on the road owing to defendants' negligence? (3) Was the stone the cause of the accident? (4) Could the deceased have avoided the accident by the exercise of reasonable care? To the first and second questions the answers were "No;" to the fourth, "Yes;" and to the third, that there was no evidence. Judgment was accordingly entered for the defendants.

RESPONSIBILITY FOR MAINTAINING A WATER-PIPE.

SUPREME COURT OF JUDICATURE—KING'S BENCH DIVISION.

Wednesday, Oct. 19.

(*Before Justices* PHILLIMORE *and* AVORY.)

Parnell v. Portsmouth Water-Works Company.

This was an appeal by the defendants from a decision by his Honour Judge Gye, sitting at the Portsmouth County Court, awarding the plaintiff the sum of 10s. 8d., the cost of repairing a communication pipe which conveyed the supply of water from the Company's main to the house.*

Sir A. CRIPPS, K.C., and Mr. CABABE appeared in support of the appeal; Mr. TINDALE DAVIS represented the respondent.

Sir A. CRIPPS said the pipe in question, which was laid under a public highway, had been in the same position for many years, though there was nothing to show at whose expense it had been laid. In 1907, a leak was discovered, and notice was given to the plaintiff by the Company to repair, under threat of the supply of water being cut off. Plaintiff had the necessary repairs effected, and three years afterwards commenced an action to recover the amount he had paid, on the ground that the repairing should have been done at the cost of the Company. The questions for the Court were: (1) Whether the payment was made under duress; and (2) whether liability to repair was upon the owner or the Company. At the trial in the Court below, evidence was given that the Company had never laid or repaired any communication-pipe; the Corporation having always allowed owners to open the roads to do necessary repairs. The Judge found that, in executing the work, the plaintiff acted under duress and a mistaken view of the law. Having regard to the terms of the Special Act and the decision in the case of *Grand Junction Water-Works Company v. Rodocanachi*,* he submitted that the duty to repair was on the owner or occupier, and that judgment should be entered for the appellant Company.

Mr. Justice AVORY: Is it not clearly sufficient for you to say that the plaintiff has not proved that the communication-pipe was laid by the Company?

Sir A. CRIPPS thought it was.

Mr. TINDALE DAVIS submitted that the County Court Judge was right on both points, which he had decided in favour of the plaintiff. No evidence was given as to who laid the pipe; and the probability was that it existed at the time the Special Act was passed. By that Act, the Company were not compelled to supply water unless the fittings were so constructed as to prevent waste; and they were the only authority having power to open public highways to repair pipes or stopcocks, as was decided in *Chapman v. Fylde Water-Works Company*,† and *Colne Valley Water-Works Company v. Hall*.‡

Mr. Justice PHILLIMORE said he was of opinion that the appeal must be allowed, though he was not at all surprised that the County Court Judge arrived at the conclusion he did, for it had taken them very considerable time and much thought before coming to an opposite conclusion. To whom the communication-pipe belonged, he was quite unable to say. From the Statutes it appeared that owners of houses under £10 were entitled to call upon a water company to put down pipes; while, on the other hand, a company could require the owners to pay a rent. But here no rent was paid, though the house was under £10. The Company required respondent to repair the pipe, threatening to cut off the supply of water if this was not done; and the respondent was able to put the pipe in repair probably because he employed a specially licensed plumber. In the Colne Valley case, it was decided that the water company, who did the repairs, could not recover the cost from the private owner; and in the Grand Junction case, it was held that the company were not bound to repair. Therefore, so long as this case stood unchallenged, it must be taken that in all cases where the Metropolis Water Act applied, a water company were not bound to repair; and in the present case, the language of the section was the same as in that Act. He rested his decision solely upon the fact that the Water Company were not bound to repair.

Mr. Justice AVORY said, there being no finding of fact as to whether the pipe was laid down by the owner or by the Company, the Court had no material for determining the question of ownership. It was sufficient to say that, in order to succeed, the plaintiff, who sought to recover money paid, as he said, under duress, was bound to satisfy the Court that the money was really payable by the Water Company, and not by him. Having utterly failed to discharge this onus, the claim could not succeed.

The appeal was allowed, with costs; and the judgment of the Court below reversed, but (by consent of the appellants) without costs.

USING DOMESTIC WATER FOR TRADE PURPOSES.

HIGH COURT OF JUSTICE—KING'S BENCH DIVISION.

Friday, Oct. 14.

(*Before the* LORD CHIEF JUSTICE *and Justices* PICKFORD *and* COLERIDGE.)

Cambridge Water-Works Company v. Hancock.

This was an appeal by the Cambridge Water Company from a decision of local Magistrates, and raised a question under sections 18 and 19 of the Water-Works Clauses Act, 1863.

Sir A. C. CRIPPS, K.C., and Mr. RAIKES appeared for the appellants; Mr. SCHILLER represented the respondent.

Sir A. CRIPPS said the respondent was summoned under section 18 of the Act of 1863 for using water for other than domestic purposes—viz., for the purpose of his business as a dairyman; and he was summoned under section 19 for affixing a pipe to a certain tap which he used in connection with his water supply. It appeared that he kept thirty cows, and at the north end of the dairy there was a tap, 4 ft. 6 in. from the ground, supplied with water by the Company. There was also a cattle-trough which was supplied with water from a pump; and it was agreed that the respondent only had a supply for "domestic purposes." Water from the tap, obtained through a hose-pipe, was used for washing a brick-paved yard and a milk-float; and water was seen running from the hose into the cattle-trough. The Justices held that the use of the water by respondent's servants on four occasions for the above purposes was not a use for other than domestic purposes, and that causing or permitting water to flow into the cattle-trough was merely incidental to the washing of the milk-float. Upon the second summons, the Justices came to the conclusion that a temporary attachment of the hose to the pipe was not an attachment within the meaning of the Act. The learned Counsel submitted, on a mere statement of the above facts, that the Justices had come to a wrong conclusion, and that the case should be remitted to them to convict.

Mr. SCHILLER contended that the purpose for which the water was being used could not be separated from the intention of the person actually using it. If a man filled a pail with water from the tap to be

* See "JOURNAL," Vol. CIX., p. 880.

* *Ibid.*, Vol. LXXXVI., p. 35.
† *Ibid.*, Vol. LXIII., p. 813; and Vol. LXIV., p. 147.
‡ *Ibid.*, Vol. XCVII., p. 291; and Vol. C., p. 576.

used for domestic purposes, and then, finding he had drawn too much, poured the surplus into the trough, he would not commit an offence within the meaning of the section.

The Lord Chief Justice remarked that water run into a trough through the hose could not be called a domestic purpose.

Mr. Schiller said it appeared from the evidence that the trough had been filled from the pump, and the end of the hose was merely put in to prevent the water running over the yard while the man went and turned off the tap. The Company practically admitted that using water for washing the float was a user for domestic purposes.

Sir A. Cripps denied that there had been any such admission.

Mr. Schiller urged that washing the yard was clearly a user of water for domestic purposes. The hose simply owed its existence to the fact that the tap was in an inconvenient position in the yard. There was clearly no offence committed by affixing the hose to the tap, as it was merely used as a vessel for carrying water for a purpose for which the respondent was entitled to use it.

The Lord Chief Justice said he was clearly of opinion that the Magistrates had gone wrong, having confounded the matters which were most material when they came to consider what they ought to do in the case. He did not say this because they thought there had been a breach of the provisions of the statute they ought of necessity to say it was either a serious or a light offence. In the first case, the respondent had got the Justices to decide that, because the Company in some cases had not made a charge for certain things for which they might have charged, therefore there had been no breach of the law which prohibited a person from using the water for other than a domestic purpose, or for any purposes other than those for which he was entitled to use it. It was perfectly true that the meaning of "domestic purpose" had been extended beyond what the framers of the Act intended; but it had never yet been suggested that that which was in effect a trade purpose could be said to be a domestic purpose because either a company had not charged under some circumstances, or something had happened which would justify the user in saying it was only casual or very small. As to washing the yard, this seemed to be a question of fact, though he could well imagine it to be distinctly a trade purpose, especially in a knacker's yard. Water used for washing a milk-float or for filling a cattle-trough might also be said to be for trade and not domestic purposes. The first case must go back to the Justices to be dealt with by them on the merits. As to the second summons, it appeared that the respondent had affixed a hose temporarily to the pipe; and the Justices found it was not an offence, as it was only a temporary affixing. He thought the case must also go back on the ground that the temporary affixing of a hose to the service-pipe might be as much an offence as if it was a permanent affixing.

Justices Pickford and Coleridge concurred; and the appeal was allowed, with costs.

Claim Against the South Metropolitan Gas Company.

At the Greenwich County Court, a few days ago, before his Honour Judge Willis, Mrs. Sarah Ann Foord, of Grays, sued the South Metropolitan Gas Company for compensation for the death of her husband, Daniel Foord. Mr. Montgomery, for the plaintiff, stated that on the 25th of February Foord met his death at the defendants' wharf at East Greenwich. He was captain of a barge, and after going on shore fell while descending the ladder from the wharf. The case turned upon the construction of the ladder; and his Honour gave judgment for the defendants.

North Oxfordshire Water Company.

In the Chancery Division of the High Court of Justice last Friday, Mr. Justice Warrington had before him a motion *ex parte* by Mr. Thorpe, in an action by one Campbell against the North Oxfordshire Water Company for the reappointment of the Receiver and Manager. Plaintiff sued on behalf of himself and all other debenture-holders. He held 40 debentures, representing £1000 out of an issue of £15,000. Counsel said the action was commenced on the 3rd of August, and came on the 10th before the Vacation Judge, who appointed Mr. Charles Frederick Bowker as Receiver and Manager till the second motion day in the present sittings, which was the 14th inst. Unfortunately, some dispute arose between the plaintiff and his solicitors, who claimed a lien on the papers; and the new solicitors, who instructed him, were unable to give notice of motion for the 14th to continue the receivership. They had given a notice for Friday, which (there having been no appearance by the defendants in the action) they had filed, but, unfortunately, not in time to be effective for that day. He was therefore obliged to move *ex parte*. The interim Receiver, who was still actually in possession, had made an affidavit to the effect that the property and assets consisted of about an acre of freehold land and pumping-house at Bloxam. There were 38 customers. The total income was between £50 and £60 per annum; while the outgoings were about the same amount. From the date of his appointment, he had received by way of rentals £9 1s. 3d., and a further sum of £19 2s. 4d., the balance to the credit of the Company at the bank. He had made payments for wages, salaries, travelling expenses, &c., to the amount of £7 10s. 6d.; and the balance of £20 13s. 1d. was still in his hands. He estimated the total value of the Company's property and assets to be about £3000. Since the previous Saturday, he had received something under £1, and had paid nothing. There was reason to believe that no appearance would be entered to the action; and it was intended to draw up a statement of claim, and put it down as a short cause on motion for judgment. He asked his Lordship to appoint Mr. Bowker as Receiver and Manager until this could be heard. Mr. Justice Warrington thought the proper thing was to appoint Mr. Bowker *ex parte* over next Friday—to give security forthwith.

Liverpool and the Test-Burner Bill.—At their final meeting for the municipal year, the Parliamentary Committee of the Liverpool Corporation had under consideration the question of further opposition to the Standard Burner Bill. It was decided to continue opposition to the third reading of the Bill.

MISCELLANEOUS NEWS.

GAS & COMMERCIAL SECURITIES CORPORATION, LTD.

A Five Per Cent. Dividend on the First Year's Operations.

The First Ordinary General Meeting of this Company was held last Wednesday, at the Offices, No. 39, Lombard Street, E.C.—Mr. R. S. Gardiner in the chair. The other Directors—Mr. S. R. Clarke and Mr. A. F. Phillips—were also present.

The Secretary (Mr. L. Maynard Brown) read the notice convening the meeting, and also the Auditors' report.

The Directors' report and the accounts having been taken as read,

The Chairman moved their adoption. In doing so, he said he wished to express the gratification of the Directors at the very satisfactory result of the first year's operations of the Company. The Company was registered at the end of May, 1909. The particulars were circulated privately; and the first allotment of shares and debenture stock took place at the end of June. On Aug. 31 last year, the total amount subscribed was £16,800; so they had not had the benefit of the present total issued capital for a full twelve months. Yet a profit of £1669 17s. 5d. had been earned, from which had to be deducted the interest on debenture stock (£397 8s. 10d.), and from which, too, the Directors were writing off half the formation expenses, or £199 13s. 5d. This left an available surplus of £1072 15s. 2d. Now one of the first questions that arose upon the accounts was the values at which the investments were to be taken. He believed it was the practice of some trust companies to write-up securities that had appreciated in value, and to write-down those that had depreciated. The Directors had decided that they would not write-up any of the investments, and that when they had appreciated in value, as several of theirs had done in the course of the year, they would remain in the books at their cost. He felt sure the shareholders would approve this wise and prudent policy, which could but strengthen the future position of the undertaking. The Directors recommended, in pursuance of this policy, that £175 be written off sundry investments—three only in number—that had depreciated to that extent, or (he should say) had done so at the date of the report; for he was glad to mention that, since the report was issued, one of the three had been dealt in on the Stock Exchange at the very figure at which the Company had purchased. He hoped the depreciation in the other two securities might also prove to be equally temporary. The Board recommended the payment of a final dividend of 3 per cent. free of income-tax, making 5 per cent. for the period under review, and leaving to be carried forward £397 15s. 2d. This would have amply sufficed to write-off the balance of the formation expenses. But the Directors thought it was, on the whole, wiser to carry forward a substantial sum to the credit of next year's operations.

So much for the revenue. What, however, was more important was the position of the investments. They comprised twenty-one widely differing securities, or an average investment of £960. They had been selected with great care, and with a view to their being permanently retained. He (the Chairman) had gone through them carefully within the previous day or two; and he could see no reason at present why they should part with any of them. He was pleased to say they could all be realized in the course of a very short time—almost a matter of days—for a total sum exceeding by several hundred pounds the Company's total capital and liabilities. This, he hoped, would be considered a most satisfactory test of their stewardship. The investments included industrial and commercial securities of every sort spread over the world; and no calamity that could befall any one country or industry, or any one commodity, could vitally imperil the Company's position. The Directors had therefore done their part in making advantageous use of the capital entrusted to them. They hoped this would induce the shareholders to make the Company better known, and to make it a little more important than it was at present. The Company had paid all the stamp duty and registration fees on a share capital of £100,000. This was the sum the Directors had in view. They did not intend issuing any circular offering shares or debenture stock; but they would continue to entertain applications for shares and debenture stock to an equal extent until the present maximum of £100,000 of each class of security had been reached. He should mention that the accounts did not include any Directors' fees. When the Company was formed, the Directors unanimously and spontaneously agreed they would not accept any remuneration until the whole of the formation expenses had been written off, and the shareholders had received a 5 per cent. dividend. The latter had been already reached; and the Board hoped next year to take some remuneration for their services. The management of the Company's business had been exceedingly interesting to himself, as well as to his colleagues.

He might add that the creation of this Company represented the fulfilment of an idea he had entertained for at least twenty years, but which pressure of other claims on his time had compelled him to defer realizing until now. During the few years that might yet be spared to him, he should do his best to strengthen the position of the Company, and to promote its enduring prosperity, to the credit of its founders, and to the advantage of the shareholders, and all associated with it. He formally moved the resolution adopting the report and accounts.

Mr. S. R. Clarke seconded the motion, which was unanimously carried.

Proposed by the Chairman, and seconded by Mr. A. F. Phillips, a final dividend of 3 per cent.—making 5 per cent. for the period under review—was declared, free of income-tax.

The Chairman, in moving the re-election of Mr. S. R. Clarke to his seat at the Board, said that, during the year, they had had occasion on the Board to appreciate the care and prudence with which Mr. Clarke examined into the Company's operations. He (the Chairman) was certain that, as long as Mr. Clarke was on the Board, the shareholders might be assured that the Company's purchases would be made with the utmost caution.

Mr. PHILLIPS seconded the motion, which was cordially agreed to.

Mr. CLARKE having acknowledged his re-election,

It was moved by Mr. E. L. BECKINGHAM, and seconded by Mr. HARGROVE, that Messrs. Monkhouse, Goddard, and Co. be re-elected Auditors for the ensuing year, at a remuneration of 20 guineas.

The motion was passed.

Mr. BECKINGHAM proposed a vote of thanks to the Chairman and his colleagues for their valuable services in managing the Company with such care and prosperity. The shareholders hoped the Chairman's expectation as to the remuneration of the Board would be realized next year. They deserved it.

Mr. L. C. FAREBROTHER seconded the motion.

The CHAIRMAN, on behalf of himself and his co-Directors, sincerely thanked the shareholders for their kind appreciation of the services of the Board.

BRUSSELS MUNICIPAL GAS SUPPLY.

Statistics for the Past Year.

The current number of the "Journal des Usines à Gaz" contains the report of the Gas Committee of the Brussels Municipality for the past year, accompanied by the accounts. They furnish the following particulars. There was expended on capital account during the year a sum of 639,446 frs., the bulk of which was for a new holder, of about 2 million cubic feet capacity, brought into use in October. At the close of the year, the total expenditure on works and plant amounted to 33,758,518 frs. (£1,350,341). The total revenue was 7,500,578 frs.; and the expenditure, 5,360,301 frs.—showing a balance of 2,140,277 frs. Allowing 87,678 frs. for the decreased value of the stores, there was left a sum of 2,052,599 frs. (£82,104). The quantity of coal carbonized was 129,513 tons, in addition to which 2908 tons of coal were used for enriching purposes and for providing an auxiliary supply of gas. The total quantity of gas sent from the works was about 1635 million cubic feet, of which some 1423 millions were sold and 120 millions used for public lighting; the rest being burnt in the offices or unaccounted for. The quantity of gas sold per inhabitant was about 7310 cubic feet; the average price being 2s. 9d. per 1000 cubic feet. The number of meters in use at the close of the year was 45,125, or 1288 more than at the corresponding period of 1908. There were installed during the twelve months 597 prepayment meters; bringing up the total number to 5866. Altogether, 28,392 cooking, heating, and other gas-appliances and 351 gas-engines were in use at the end of the year. The mains were increased by about 9500 yards; making the total length 224,550 yards. For the public lighting 7562 lamps were employed, containing 7420 upright and 1393 inverted burners. After midnight, 1179 burners were extinguished.

PROGRESS OF VIENNA MUNICIPAL GAS UNDERTAKING.

The report of the Administration of the Vienna Municipal Gas Undertaking for 1909 is the tenth issued since the establishment of the Municipal gas-works; and the "Zeitschrift des Vereines der Gas- und Wasserfachmänner in Oesterreich-Ungarn" takes the opportunity to quote figures from it, and promises in succeeding articles to discuss the progress which has been made by the undertaking in the decade. A few figures from the exhaustive summary given in the pages of our Austrian contemporary may be reproduced.

Last year the City Council of Vienna decided to abolish the triple management of the undertaking which had hitherto prevailed, and, instead of having separate administration, works, and accounts managers, to place the whole undertaking under one manager. Considerable simplification of business resulted from the change. The gas made in the year 1909 amounted to 4,026,785,000 cubic feet, of which 3,329,440,000 cubic feet were coal gas, and the remainder, amounting to 17·3 per cent. of the total make, water gas. The output of gas was 5·07 per cent. more than in 1908. It is believed that this output would have been greater but for the exceptionally mild weather experienced in the second half of the year. The average make of gas per ton of coal carbonized was 10,992 cubic feet. The maximum number of retort-settings in use at any time was 170, and at the same time five settings of inclined large carbonizing chambers were in use. The average weight of a charge per retort was 381 lbs., and per carbonizing chamber 18,298 lbs. The raw materials used in the production of water gas amounted to 54·1 lbs. of coke used in the generators, 17·2 lbs. of coke used as boiler fuel, and 15·4 lbs. of gas oil, per 1000 cubic feet of water gas made. The tar produced in the water-gas plant amounted to 16·2 per cent. of the oil gasified. The production of coal tar amounted to 5·01 per cent., and of ammonia to 0·2523 per cent., of the weight of coal carbonized. The specific gravity of the gas distributed averaged ·459. The mean gross calorific power of the gas was 593 B.Th.U. per cubic foot.

The installation of inclined carbonizing chambers was extended during the year—the number of chambers being increased from 15 to 34; so that the productive capacity of the installation now amounts to about 2,825,000 cubic feet of gas per diem. Separate exhausting, tar-extracting, and purifying plant were provided for the water-gas installation, thereby liberating the portion of the coal-gas apparatus which had hitherto been used for the water gas. This was done in preparation for the extension of the carbonizing plant on the works to a productive capacity of 23 million cubic feet per diem. The erection of a gasholder of 5,300,000 cubic feet capacity, which was started in 1908, was completed, and the holder was brought into use last autumn. The holder stands in the open, whereas the earlier ones on the works are in houses; and it has a steel tank with bulged or arched sides. Additional transformers were added to the electrical plant on the works for transforming the alternating current of 5000 volts taken from the adjacent Municipal electricity works to direct current of 220 volts.

The gas made was accounted for as follows: Supplied to consumers through ordinary meters, 85·05 per cent.; through prepayment meters, 3·01 per cent.; to the corporation, 1·69 per cent.; for public lighting, 6·54 per cent.; for works' use, 0·54 per cent.; and unaccounted for, 3·17 per cent. Excluding gas used for public lighting, the consumption per head of the population amounted to 2892 cubic feet. The length of mains in the distributing system was, at the end of the year, 438½ miles, and the average diameter of the mains was 12½ inches. The number of ordinary meters in use at the end of the year was 113,783, and of prepayment meters 16,098. The number of prepayment meters had increased in the course of the year by 34·4 per cent. The number of street-lamps supplied with gas in the municipal area was 20,790, of which number 21 were equipped with single inverted burners and 1101 with two inverted burners. The rest had upturned burners. About half the street-lamps were kept alight all night and half only during the evening hours. The employees (including officers) of the gas undertaking at the end of the year numbered 1911. The surplus realized on the year's working amounted to 4,311,805·78 kronen (about £179,658), which is about £33,751 more than the surplus realized in 1908. After making allowance for insurance, depreciation, and interest, a net profit of 3,911,830·12 kronen (about £162,976) has been transferred to the municipal chest.

The progress which these figures for the past year represent in the working of the municipal gas undertaking since its inception ten years ago is to be discussed in the next article of the series in the Austrian Journal; and this will be dealt with in due course in our columns.

THE EXTENSIONS AT THE ILKESTON GAS-WORKS.

Official Inspection.

In the last number of the "JOURNAL," a description, with illustrations, was given of the extensions which have been carried out at the gas-works of the Ilkeston Corporation, from the plans and under the supervision of the Gas Engineer, Mr. F. C. Humphrys. An official inspection of the works was recently made by members of the Town Council, on the invitations of the Chairman and Vice-Chairman of the Gas Committee (Alderman F. Beardsley and Mr. W. Tatham). The party were conducted round the works by Mr. Humphrys, who fully explained the operation of the machinery. After the inspection, the company partook of tea.

At the close of the repast, Alderman Beardsley said he hoped, after what the visitors had seen, they would be satisfied that the money which had been laid out had not been spent foolishly. The extensions had been a big job; but the Corporation had as their Gas Engineer a good man, who never seemed to fail in anything that he had taken in hand. Mr. Tatham having offered a few remarks to the same effect, Mr. Humphrys said it might seem rather strange to have an official inspection of plant twelve months after it had been in operation; but it seemed to him that this had its compensations, because it proved that the plant had passed the experimental stage. The reason for there having been a certain amount of delay was because they had not been engaged in building entirely new works, but in remodelling old ones on a new plan. They were consequently handicapped in many ways. In some cases they had had to pull down work before they could even think of letting the next contract. The undertaking had comprised no less than twelve principal contracts; and it had not been possible to have more than three or four of them going at the same time. One important feature of the work completed was that it had not necessitated dispensing with the services of a single workman on the permanent staff. He made up his mind that the old hands should have the first opportunity of learning how to work the new machinery, and, if possible, to do so permanently; and the result was that the men they had seen working were those who fourteen months ago were employed using the shovel. The Mayor (Alderman C. A. Sudbury) said that, after seeing the result of all the money that had been spent, he thought they could congratulate themselves that they had obtained very good value indeed for it. Not only were they satisfied that they had this, and that therefore they would have in the gas-works an increasingly valuable asset, but they were also very pleased to hear from the Engineer that the labour had to a certain extent been "de-casualized," and that the conditions of working for the men had improved as well as the condition of the works. He concluded by proposing the health of the Chairman of the Gas Committee; and with Alderman Beardsley's brief response the proceedings closed.

Improved Public Lighting for Brentford.—At the last meeting of the Brentford District Council, a proposal was considered from the Gas Company in regard to street lighting. The Company offered to provide each lamp with a clockwork lighter and extinguisher, and to either alter the present lanterns or to fix new ones with inverted incandescent burners, without cost to the Council, provided the Council would enter into an agreement for ten years, based on the conditions of the one at present in operation. It was decided that the Company should be informed that the Council were prepared to determine their existing agreement, and to enter into a fresh one for five years, provided the Company carried out the work.

Lighting Display at Exeter.—During the "shopping week" in St. Sidwell Street, Exeter, which commenced last Thursday, a large part of the illumination was undertaken by the Exeter Gas Company; and Mr. S. Herbert, speaking as Chairman of the St. Sidwell's Tradesmen's Association, thanked the Company for the assistance they had rendered in the matter of lighting. Mr. Westlake, the Manager and Secretary, in reply, said the Company desired to co-operate with the traders in the "shopping week." The Company have erected a high-pressure gas installation at No. 29, in the above-named street, which, it is claimed, gives three times the light of the ordinary low-pressure burners for the same consumption of gas. There are six 500-candle power lamps outside the building, and they cost only ½d. each per hour for gas. The display is a very fine one.

IMPROVED PUBLIC LIGHTING IN MANCHESTER.

Important Installation of the Keith System.

Last Tuesday evening, there was brought into use for the first time an installation of high-pressure gas lighting in an important section of Manchester. With the view of being abreast of the times in the provision of improved lighting in the city, the Gas Committee some time ago arranged for the erection in the streets round the old Royal Infirmary site of 21 lamps fitted with Keith's high-pressure inverted burners. One of the lamps is suspended in a U-shaped bracket at the corner of Piccadilly and George Street; and the remainder, in harp-shaped brackets 6 ft. by 4 ft. 6 in., fixed on special pillars 12 feet high, have been set up in George Street, Parker Street, and a portion of Portland Street. Each of these 20 lamps, with bye-pass, consumes 25½ cubic feet of gas per hour, and gives a light of 1500-candle power. This is a considerable gain; but it falls far behind the light-giving power of the lamp at the corner of Piccadilly and George Street. In this case, a light equal to 3000 candles for a consumption of 51 cubic feet of gas per hour, including bye-passes, is given. Thus for a total consumption of 561 cubic feet per hour, the city has illumination equal to 33,000 candles. At twelve o'clock each night the high-pressure lamps are extinguished, and 21 low-pressure inverted lamps, which are suspended from swan-neck brackets fixed at the top of each pillar, will be lighted. Each of these lamps consumes 5 cubic feet of gas per hour, and gives a light of 100-candle power. The high-pressure lamps supersede 21 low-pressure ones which contained 55 upright burners, each consuming 5 cubic feet of gas per hour and giving a light of 80 candles. The new low-pressure lamps are 25 per cent. better than those hitherto in use. With regard to the high-pressure lamps, the public get from 561 cubic feet of gas per hour a light of 33,000 candles, compared with a light of 4400 candles with a consumption of 275 cubic feet per hour. The citizens get seven-and-a-half times more light for a trifle more than twice the expenditure of gas. The gas is compressed to 54 inches water pressure by a Keith rotary compressor coupled direct to an electric motor.

The new lighting was formally inaugurated by Alderman Gibson, the Chairman of the Gas Committee of the Corporation, in the presence of the members and chief officials, including the Superintendent (Mr. F. A. Price) and the Engineer (Mr. J. G. Newbigging, M.Inst.C.E.). At the close of the ceremony, the company returned to the Town Hall, where, under the presidency of Alderman Bowes, the senior member, Alderman Gibson was entertained at dinner, in commemoration of his services as Chairman of the Committee for seventeen years, and also in recognition of his personal qualities.

Prior to the dinner, a special meeting of the Committee was held—the Lord Mayor (Mr. Charles Behrens) in the chair—at which the following resolution was unanimously adopted: "That the hearty and sincere thanks of the members of this Committee be tendered to Alderman Robert Gibson, Justice of the Peace for the City of Manchester, for the able and valuable services he has rendered as Chairman of the Manchester gas undertaking for the long period of seventeen years, and to assure him of the high esteem and regard in which he is, and always has been, held by his colleagues on the Committee. The time that Alderman Gibson has unstintedly devoted to the interests of the gas consumers and ratepayers of the city has not been equalled in the history of the undertaking by any of his predecessors in the chair. When presiding over a meeting, he has ever been distinguished by his courtesy and fairness; and while showing every consideration for the opinion of those who differed from him, he has invariably succeeded, by tact and ability, in securing harmony in the deliberations of the Committee, and guiding the members to a right and just decision on questions of policy. While congratulating him on the continued prosperity of the Manchester Gas Department and on its present strong financial position, the members are proud to know that Alderman Gibson is regarded throughout the gas industry of Great Britain as an ideal chairman of a large undertaking. Every member of this Committee desires to express the hope that Alderman Gibson may, in the providence of God, be spared for many years to enjoy the confidence of his colleagues and of the gas consumers of the city of Manchester generally."

PUBLIC LIGHTING OF PADDINGTON.

The Question of Gas or Electricity.

At the Meeting of the Paddington Borough Council last Tuesday, the subject of the public lighting was again under consideration. It will probably be remembered that, at the meeting of the Council on the 4th inst., a report from the Works Committee, recommending improved gas lighting for the streets of the borough, was referred back for further consideration, with special reference to the prices charged by the Gaslight and Coke Company to the Hampstead Borough Council in their new contract, and with a view to getting a shorter contract [see *ante*, p. 143]. The Committee again reported in favour of lighting the streets by gas; and the Finance Committee likewise again reported favourably upon the question. The Works Committee stated in their amended report that they had acted upon the references of the Council by interviewing the Controller of the Sales Department of the Gaslight and Coke Company (Mr. F. W. Goodenough), and had obtained from the Company satisfactory assurances that the terms they offered to Paddington were even better than those quoted to Hampstead. They said the difference in the prices was more than accounted for by the following: (1) The extra cost of installing new lamps at Paddington, as against the conversion only of the old lamps in Hampstead; (2) higher candle power per lamp in Paddington than in Hampstead, involving extra consumption of gas; (3) the Company undertaking all responsibility for knocked-down lamps; and (4) the Company undertaking to light the lamps on foggy days, without extra cost. The Committee ascertained that the Company's offer was absolutely their lowest price; but that they might be disposed to consider the possibility of reducing the minimum contract period of five years to three, though five years was regarded as a very common period for such contracts. The Committee added that the Metropolitan Electric Supply Company, Limited, had written stating that they would be pleased to submit a tender for street lighting by electricity, on the understanding that their tender and that of the Gas Company were sealed, and considered by the Committee at the same meeting. In an interview which the Borough Surveyor previously had with the Electric Supply Company's Engineer, it was ascertained that the Company were not at present prepared to offer terms for the lighting of the whole of the borough with electricity, as it would be necessary to lay new mains for a further 25 miles, which would cost between £20,000 and £30,000 for mains only. The Engineer stated that his Company could offer a scheme for electrically lighting only about 35 miles of streets where mains already exist. The Committee gave instructions for the Company to be informed that they were unable to recommend the Council to pledge themselves in this manner, or to divide the borough for the purposes of lighting it partly by electricity and partly by gas. They concluded by recommending that, subject to the consent of the London County Council being obtained to the loan, the Council should enter into an agreement with the Gaslight and Coke Company for lighting the borough in accordance with the conditions mentioned in their letters of the 5th, 13th, and 25th of July, 1910, the two provisoes contained in the report of the Finance Committee [*ante*, p. 144], and the arrangements made by the Borough Surveyor with the Company's representative.

Mr. E. C. Elgood, the Chairman of the Works Committee, in submitting the report, explained that the difference in the price for the single-burner lamps in Hampstead and Paddington—viz., £2 12s. 6d. and £2 5s. respectively—was accounted for by the fact that new all-copper lanterns were to be provided by the Gas Company in Paddington, while in Hampstead the Company were going to convert the existing lanterns, adapting them to take the new inverted fitting. With regard to the proposal of the Metropolitan Electric Supply Company that any tender they might send in should be sealed, and dealt with at the same meeting as the offer of the Gas Company, he considered it a most unfair and unbusinesslike suggestion to make, and one which he could not recommend should be considered, seeing that the terms of the Gas Company had been made public.

Mr. Henwood opposed the recommendation, stating that, in his opinion, the reasons given by the Gas Company for the difference in the price for single-burner lamps in Hampstead and Paddington was only the half-truth. It was not necessary for the lanterns in the side streets to be "scrapped," as they were capable of taking the single inverted incandescent burners. He should like to ask the Chairman of the Works Committee if it was impossible to adapt the existing lanterns for the single burners.

Mr. Elgood said it was not impossible, but it was inadvisable.

Mr. Henwood then suggested that the matter should be referred back to the Works Committee to obtain prices from the Electric Supply Company for publicly lighting the portion of the borough where they have their mains laid.

Mr. E. S. M. Perowne, the Chairman of the General Purposes Committee, pointed out that, under the Standing Orders, the reference should have been sent to his Committee as well as to the Works and Finance Committees; and he claimed the right of having the report sent to his Committee. He thought the Electric Supply Company should have a chance, and that the Council should do their best for the ratepayers.

The report was eventually referred back to the Works Committee, with instructions to obtain estimates from the Metropolitan Electric Supply Company. It was also decided to send it to the General Purposes Committee.

PUBLIC LIGHTING OF WAKEFIELD.

Some discussion took place at the last meeting of the Wakefield City Council, in connection with the minutes of the Street Lighting Committee, which contained a recommendation that a number of new lamps should be erected in different parts of the city.

Alderman Atkinson, who asked if any of the proposed lamps were on the route of the electric cable, expressed the opinion that, in the case of lamps in new streets, &c., they should use electricity for lighting as far as possible. It would, he pointed out, be a hardship on the Gas Company to get them to erect a number of new lamps, and then in a year or two throw them on the Company's hands. He was certainly not in favour of abolishing gas-lamps wholesale. He noticed a statement had been made to the effect that the Gas Company received something like £4000 a year for public lighting in the city of Wakefield. He had inquired into this, and found the actual sum paid by the Corporation was something less than £3000. They should remember that the Gas Company paid the Corporation £3159 in rates; and a private firm would be chary of insulting such a customer. The Company also paid a large amount in wages, 75 per cent. of which found its way into the coffers of the Wakefield tradesmen.

Mr. Stonehouse said he was asked recently how much the Corporation paid for public lighting; and he replied that he thought the sum was about £4000, of which the Electric Lighting Department received £900. He believed the accounts would bear out this statement. He did not wish the Corporation to deal harshly with the Gas Company; and he did not advocate abolishing all gas-lamps straightaway, and substituting electric light in their place. But seeing that the electric light undertaking belonged to the Corporation, it ought to receive more support from them than it had done in the past. Alderman Atkinson had alluded to the rates the Gas Company paid. One might get the idea that the Company was a philanthropic undertaking, run for the benefit of the ratepayers of Wakefield. This heavy contribution to the rates of Wakefield was the result of the building up of a huge monopoly, at the expense of the Wakefield ratepayers. The Company had supplied a commodity that was wanted; and they had made a good profit on it. Let them not talk about their obligations to the Gas Company, for it was ridiculous. The wages paid by the Company were not paid from philanthropic motives, but from purely commercial instincts. He did

not wish any harm to the Gas Company. He hoped the undertaking would continue to prosper; but he did not wish it to prosper at the expense of a concern that belonged to the Wakefield ratepayers.

Mr. COPE said the Gas Company had always done very well in the matter of street illumination. Electric lighting was not yet perfect; and the Committee had tried to run the public lighting of the city on the best business lines.

Alderman ATKINSON remarked that he held no brief for the Gas Company, and was only anxious to do that which was fair.

The minutes were adopted.

SALFORD GAS-METER RENT CHARGES.

Gas Committee Recommend their Abolition.

The Gas Committee of the Salford Town Council held a special meeting last Friday afternoon to consider the protests which have been made by gas consumers against the re-imposition of gas-meter rents. After a long discussion, the following resolution was agreed to: "That, in view of the strong feeling prevalent in the borough against the imposition of charges for gas-meter rents, this Committee recommend the Council to rescind so much of the resolution passed on June 22, 1910, as relates to gas-meter rents." This recommendation will come before the Council at their meeting to-morrow. Alderman Desquesnes had given notice that he would move the adoption of the following resolution at this meeting of the Council: "That it be an instruction to the Gas Committee to discontinue the charge for meter-rents as from the first practicable date; and should it be necessary to raise any further revenue in lieu thereof, in order to meet the increased cost of coal or of the administration of the gas undertaking, to so raise it by re-adjustment of the charges for gas in the usual way." As the recommendation of the Gas Committee is pretty certain to be adopted, in view of the widespread feeling of indignation expressed at public meetings and otherwise, to which reference has been made in the "JOURNAL," there will be no need for Alderman Desquesnes to bring forward his motion. It is understood that those who have paid meter-rents in last quarter's bills will have the money refunded if the Council adopt the Gas Committee's recommendation.

A member of the Salford Gas Committee, in the course of an interview on Saturday, admitted that the resolution agreed to by the Committee the previous afternoon was in the nature of a "climb down." He said they had ample evidence that the great majority of the gas consumers were strongly opposed to the re-imposition of the meter-rent charges; and recognizing this, the Committee came to the conclusion that the best thing to do was to rescind the resolution passed at the June meeting. He also admitted that the Committee would now have to consider the question of raising the price of gas if they were to be in a position to meet their obligations. When the estimates were before the Town Council in the early part of the year, pressure was brought to bear upon the Committee to increase their contribution out of profits in relief of the rates; and this being so, they had to look for a means of augmenting the revenue of the Gas Department, especially as coal was going to cost them more in the current year. An additional reason for the re-imposition of meter-rents after sixteen years was that in the interval the number of consumers of electricity had greatly increased, all of whom practically kept gas-meters at their establishments merely for use in emergencies. The Corporation had a considerable sum invested in gas-meters; and the cost of inspection and maintenance was no small item per annum. Therefore the Gas Committee thought that, under the circumstances, it would be best to re-impose the rents; this being preferable to raising the price of gas.

GAS PROFITS AT KEIGHLEY.

The statement of accounts of the Keighley Corporation Gas Department for the year to June 30 was submitted by the Chairman of the Gas Committee (Mr. J. Harrison) to the monthly meeting of the Town Council. It showed that there had been a gross profit of £17,473; and after deduction of interest on loans and charges in respect of sinking fund, renewals, and insurance, there remained a net profit of £8493. Of this amount, it was proposed to transfer £6013 in relief of the rates. This left a balance of £2480, which, with the balance brought forward from last year's account of £8101, gave a surplus of £10,581. In addition to the sum which it was proposed to transfer in relief of the rates, the Committee recommended that £50 be given to the funds of the Keighley Victoria Hospital, £5000 transferred to the renewals and insurance account, and the balance carried forward.

The adoption of the statement and of the Committee's recommendation having been moved and seconded, Mr. Smith asked for consideration for the penny-in-the-slot meter users, who were charged 5d. per 1000 cubic feet more for gas than the credit customers. Alderman Howley moved an amendment to refer the recommendation back, with an instruction to the Committee to consider the desirability of giving a reduction to prepayment-meter users. Mr. Walsh seconded, and Mr. Midgley supported, the amendment; the latter also contending that a concern which was making £10,000 a year profit ought not to be paying 20s. per week to men who had been working for the Corporation for six or seven years. Mr. Whitehead said the Committee already had under consideration a reduction in the price of gas all round; and the members were fully alive to the various matters mentioned.

The amendment was carried, after more than half the members of the Council had spoken on it and several remarks had been made on the coincidence of this subject invariably cropping up on the approach of the November elections.

Borrowing Powers at Belfast.—The Belfast Gas Committee have decided to recommend the Council to include in the proposed Bill to be promoted in Parliament powers to enable them to borrow the sum of £100,000 for the general purposes of the gas undertaking.

ELECTRIC LIGHTING IN BERMONDSEY.

An Unprofitable Undertaking.

The Electricity and Street Lighting Committee of the Bermondsey Borough Council having proposed that application should be made to the Board of Trade for a Provisional Order authorizing the Council to supply electricity within the parishes of St. Olave (Southwark) and St. Thomas and St. John (Horsleydown), the subject was considered at a special meeting held last Tuesday. The district which the Council are desirous of supplying includes the large warehouses, wharves, and business premises in Tooley Street, which are now served by the County of London Electric Supply Company and the London Electric Supply Corporation.

In moving that the Council should agree to the proposal, Mr. J. W. Oake said the parishes named were anxious to enjoy the same blessings as the other parts of the borough; and the Committee had, by a large majority, decided to recommend that they should be linked up with them. Mr. E. Stickland, in opposing the recommendation, said that the area concerned was the richest part of the borough, and the Council were led to believe that the three parishes wished to be supplied by them. This was not true. They did not desire to be served by an undertaking which had been a charge upon the rates. It was a most unfair proposal to the poorer ratepayers, who had to make up any loss. They had had a good deal of experience in supplying three-fifths of Bermondsey, and had no wish to add to their burdens. The undertaking, as revealed by the accounts presented to the Council did not show that it was in anything like a flourishing condition. The total debt upon it was now £152,974. The total loans raised amounted to £170,000; and of this they had paid back only £12,000. The interest paid for loans and overdrafts had increased from £3654 in 1906 to £5458 in 1910. Only in the first year of the undertaking had they set apart any sum for a reserve fund, when they allocated £3000. For the past year, they could only show a surplus of £43 on a capital of about £152,000; and it seemed ridiculous that they could only produce such meagre results. It had been stated that the gross profits were equal to a dividend of 6½ per cent.; but the figures were illusive, as the Council had no depreciation account. The cost of generating current was 0·69d. per unit for establishment charges; but when they included repayment of loans and interest, it was 1·49d. per unit. Yet they were selling electricity at ⅜d. per unit to some consumers. To counterbalance the loss, the Committee charged the Council 1⅜d. per unit for lighting the streets, which meant an extra cost to the borough of £2000 to £3000 a year. The Companies' figure for producing electricity was 0·35d. per unit; and they were prepared to fight the Council tooth and nail in their application for the Order. Mr. F. Franken said an undertaking with a capital of £152,000, showing a profit of only £43 on the year's working, could only be described as "rotten." By 28 votes to 23 the Council decided to adopt the proposal of the Committee.

ASSOCIATION OF MUNICIPAL CORPORATIONS.

There was a large attendance at the autumn general meeting of this Association, which took place on the 7th inst., in the Whitehall Rooms of the Hotel Metropole. The *agenda* was not a long one; but the subjects dealt with included two on which much diversity of opinion was expressed by speakers—namely, Local Taxation and the Shops (No. 2) Bill.

Mr. A. H. SCOTT, M.P. (Vice-President), occupied the chair, in the unavoidable absence of the President (Mr. J. Harmood-Banner, M.P.); and he read the remarks which the latter gentleman would have made had he been present. In the course of these, Mr. Harmood-Banner pointed out that one matter introduced by the Government which had passed into law was the Municipal Corporations Amendment Act, which effected an important alteration in the constitution of town councils. Then there was a Private Member's Bill which, if it had passed, would have had a far-reaching effect. This was the Water Supplies Protection Bill, which was referred to a Joint Committee of the two Houses. The Association issued a full report on the Bill—pointing out that it would place very severe difficulties in the way of local authorities who were proposing to undertake water supply schemes. The Bill was absolutely one-sided; and it was a matter of considerable satisfaction to find that the views urged upon them prevailed with the Joint Committee, who reported against the measure. The question of finance had again engaged much of the time of the Association; and it would continue to do so until the Government were prepared to meet the requirements of municipalities. The Association had been largely instrumental in securing some relaxation in regard to the periods fixed for the repayment of loans raised for the erection of school buildings. They had pointed out that thirty years was an unduly short time for the repayment of such loans.

LOCAL TAXATION.

The TOWN CLERK OF WOLVERHAMPTON moved "That, in view of the remarks made by the Chancellor of the Exchequer to the deputation from the Convention of the Royal Burghs of Scotland and to the deputation from the Urban District Councils Association, it be an instruction to the Law Committee to submit for the consideration and approval of the Council and of the Association a scheme for submission to His Majesty's Government containing, *inter alia*, definite proposals (*a*) for the broadening of the basis of taxation for local purposes, and (*b*) for the solution of the problems in relation to local and Imperial finance." He suggested that for this purpose there should be added to the Law Committee the names of gentlemen who had been on other committees which had dealt with the subject of local taxation. In local taxation, he pointed out, a man paid, not according to his ability, but because of his occupation of certain property which had a certain rateable value. There was no taxation whatever of personal property, and before any system of broadening the basis of local taxation could be adopted, it was needful to provide a uniform system of valuation throughout the country. What was needed was the broadening of the basis of

taxation; but how could this be done? Various suggestions had been made at different times; and one of these had reference to a further income-tax as a possible source of revenue—that was to say, on investments, profits, and official salaries. Of the taxable income of the country, more than £185,000,000 were now untaxed, owing to certain exemptions. There was a little reservoir here which might be tapped. They must transfer the national services; have further grants towards such expenditure; or add to the basis of the present income-tax by receiving money in that direction. Thousands of men who were deriving great benefit from good local government did not pay one penny piece into the local exchequer. They had received a courteous invitation from the Chancellor of the Exchequer asking the local authorities to assist him in a very difficult matter; and as representing the municipalities of England, it was the bounden duty of the Association to set to work and show him what, in their opinion, ought to be done to relieve the authorities in respect of financial affairs.

The Town Clerk of Liverpool seconded the motion.

The Town Clerk of Blackburn moved, as an amendment, that the Special Committee alluded to in the resolution should be instructed to take into consideration the invitation addressed by the Chancellor of the Exchequer to the local authorities to make proposals for the broadening of taxation and for the solution of the problems relating to local finance, and report to the Council of the Association thereon. The original resolution instructed the Committee to bring forward definite proposals; while the amendment asked them to consider the matter, and advise the Association. "Broadening the basis of local taxation" was a very comforting phase; but it meant one of two things. Either they were going to take from the Chancellor of the Exchequer certain taxes and devote them to local purposes, or they were going to propose fresh taxes. Were the Association prepared seriously to take upon themselves the onus and opprobrium of proposing fresh taxes? It was the Chancellor's duty to do this. Instead of making definite proposals straightaway as the resolution suggested, the Special Committee should report with regard to the Chancellor's invitation. It would then be open to the Council to say to the Chancellor, "We have sent you a statement of our grievances and what we want. If you wish to know how this money is to be raised, take out of your pigeon-holes the report of the Commission on Local Taxation and study that."

The Town Clerk of Salford seconded the amendment, which was carried by a substantial majority.

The West Ham Overdraft Case.

The Town Clerk of Leeds said he thought there had been a considerable amount of misapprehension as to what was the effect of the West Ham Corporation case with respect to bankers' overdrafts. It seemed to him it had decided nothing fresh. All corporations of the country agreed that borrowing powers must be exercised for the specific purposes for which they were granted, and for nothing else. Two extremely important points were not decided at all—in fact, the two that were of the greatest importance to municipal corporations. The judgment specially exempted these two questions. No decision was come to as to whether a corporation might obtain an overdraft on capital account from their bankers for a specific purpose, or as to whether a corporation might obtain an overdraft for revenue purposes. He believed that the majority of the councils had power in respect to the first-named matter; and many also possessed it in regard to the second—the Scotch corporations almost universally had it. There was, of course, a great deal to be said on this subject; and it wanted carefully considering. But he was not at all alarmed about the West Ham case. He moved that the question be referred to the Law Committee to take such action upon it as they might think fit.

The Town Clerk of Woolwich, in seconding, said the question was an important one, especially to those corporations who were engaged in municipal undertakings, where the provision of a large working balance was absolutely essential. The only satisfactory way in which they could obtain this balance was by securing a temporary overdraft upon revenue account. Otherwise they would have to raise at the expense of the ratepayers a large sum for a working balance; and this he considered a very unfair method of meeting the difficulty. He agreed that there was probably nothing fresh in the West Ham case; but what troubled them was not so much what had been expressly decided in this action, as the inference which might be drawn from the judgment.

The Mayor of Newport remarked that in his town they were face to face with the effects of this decision; and they would like something done as soon as possible.

The motion was carried.

Audit of Municipal Accounts.

The Mayor of South Shields said he had been requested by his Council to ask what steps had been taken by the Law Committee (in pursuance of the resolution of the Council on June 17, 1909) to have carried out the recommendations of the Municipal Trading Committee of 1903, in regard to the audit of municipal accounts; and, if necessary, having regard to the unsatisfactory nature of the present system of auditing by elective auditors, to move that the Government be urged to bring in a Bill to deal with this question. He remarked that his Council felt strongly that the continuance of the present system of elective auditors was undesirable and in the highest degree inefficient. They therefore wished to know whether the Law Committee had taken any steps to deal with the matter.

The Town Clerk of Wolverhampton, as Chairman of the Law Committee, replied that the question was referred to a Sub-Committee, who reported in July last. They were of opinion that the system of audit recommended by the Municipal Trading Joint Committee would be more satisfactory, both to the local authorities and the ratepayers, than either audit under the Municipal Corporations Act or by district auditors; and they therefore recommended that the Prime Minister and the President of the Local Government Board be invited to introduce a Bill giving effect to the recommendations of the Joint Committee on Municipal Trading of 1903, and that the Institute of Chartered Accountants and the Incorporated Accountants' Society be invited to support

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the action of the Association. This resolution had been submitted to the Council and forwarded to the Prime Minister and others. Subsequently, a resolution was passed by the Association of Chambers of Commerce of the United Kingdom to the effect that, in view of the recommendations of the Joint Committee of both Houses of Parliament in 1903, in regard to the abolition of the Local Government Board audit and the system of elective auditing, the Association desired to express regret that no action had been taken to put the recommendations into force, and respectfully urged the Government to bring in a Bill at the earliest opportunity to give effect to the Committee's recommendations.

The MAYOR OF SOUTH SHIELDS expressed himself as satisfied with this explanation.

Several other items of no particular interest to "JOURNAL" readers were discussed; and the proceedings terminated with a vote of thanks to the Chairman.

WATER SUPPLY OF LIVERPOOL.

At the final Meeting for the municipal year of the Liverpool Corporation Water Committee, a cordial vote of thanks was passed to Colonel Porter, the Chairman, for his services during the past twelve months.

Colonel PORTER, in response, said it would be impossible for him to occupy such a responsible position with success but for the support he had received from the Deputy-Chairman (Major Denton) and every member of the Committee. He was sure they had shown him particular indulgence during his first year of office, considering that he had followed ex-Alderman Burgess, who occupied the position for so many years, and was so cognizant with the work. The total quantity of water supplied during the 52 weeks ending Sept. 24 to Liverpool and the out-townships, and including Chorley, amounted to 11,932,082,000 gallons; being an increase of 16,823,000 gallons on the corresponding period of the previous year. The population now supplied with water from the works of the Corporation was about 1,133,000; and it continued to grow steadily at the rate of 12,000 per annum. The number of new houses supplied with water during the past year in the Liverpool district was 2320, exclusive of new houses beyond the Liverpool district in places supplied in bulk. There was an increase of 42,000,000 gallons in the quantity supplied by meter for trade purposes, which was very encouraging, seeing that the previous year showed a decrease of 147,655,000 gallons. There were indications that between now and the end of the current financial year there would be still further improvement in trade consumption. The supply to shipping, on the other hand, was disappointing, showing a small decrease of 4,620,000 gallons; but the demand had been improving during the last month or two. The extension and relaying of iron pipes during the year was equal to 6142 miles, or little more than half the mileage of the previous year—showing that fewer new streets had been laid out. As to afforestation, they had been proceeding steadily, having planted at Rivington during the year 363,863 trees of various kinds. It had been found that the Rivington area was particularly favourable to the production of birch; and they had therefore planted nearly double the number of birch trees than that of any other one variety. At Vyrnwy, they had planted 205,600 trees; the Douglas fir here taking the place of birch, as that variety gave the best results. The ordinary work of the Committee, which was constantly growing in importance, had gone on smoothly during the year; the principal event being the completion of the Marchnant diversion. Although this was only one of many great engineering works successfully carried out in connection with the water undertaking by Mr. Joseph Parry, their Engineer, ably seconded by his staff, yet, as it marked the completion of their great works at Vyrnwy, it was thought fitting to celebrate it in an especial manner; and the gracious visit of the Prince of Wales, now His Majesty the King, to Lake Vyrnwy on March 16, had, among other good results, had the effect of bringing prominently before the country the excellence and abundance of the water resources of Liverpool, and would make the year 1910 for ever memorable in the annals of the Corporation and of the Committee.

BRAMPTON WATER SUPPLY.

Inauguration of Reservoirs.

The new water-works for the supply of the district of Brampton, which have been under construction for some time past, have lately been inaugurated; the water being turned into the reservoirs by Mr. William Dobson, the Chairman of the Brampton Rural District Council, in the presence of a large company of local representatives and other gentlemen. The scheme is an extensive one; the district served covering 40 square miles, and there being 32 miles of pipes. The water is supplied under agreement originally by the Carlisle Corporation; and the reservoirs lately inaugurated have been constructed to receive it. One is at Garth Head, Castle Carrock, about four miles from Brampton; and into this the water is pumped, to a height 670 feet above sea level, from the Corporation's reservoir. The other is at Cowran, at a height of 440 feet, and the water enters this direct from the main. The Engineers of the scheme were Messrs. Taylor, Wallin, and Taylor, of Newcastle-on-Tyne.

On the occasion of the inaugural ceremony, a description of the works was given by Mr. W. Wallin, representing the Engineers. He said that ever since 1892, the water supply of the parishes of Castle Carrock, Hayton, Brampton, and Irthington had received the deliberations of the Rural District Council. Difficulties had to be overcome; and it was not until 1897 that the Council were able to definitely decide that the most satisfactory scheme for the Brampton portion of their district was a comprehensive one, to include all the local villages.

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In February, 1898, Mr. Harry W. Taylor, the senior member of the firm he represented, was instructed by the Council to prepare a scheme of water supply for the districts; and in April, 1898, it was adopted. It consisted of tapping certain springs in Geltsdale, and was provisionally sanctioned by the Local Government Board in May of the same year. But by the passing of the Carlisle Water Act, 1899, the Carlisle Corporation obtained powers to take the water from the springs selected as part of their undertaking, and agreed to furnish a supply of water in bulk to the Brampton Rural District Council. Consequently the original scheme had to be revised, and the one now carried out was the result. In February, 1909, tenders were advertised for, and a commencement was made with the actual construction in the middle of June. The estimated population to be supplied was about 4000; but to this should be added a supply for the farms for agricultural purposes. The water was supplied to the Rural District Council by the Carlisle Corporation, in accordance with the undertaking given in their Act, at two points—at the Garth Head reservoir and at the Cowran reservoir. The former had a capacity of 97,500 gallons; and the latter would hold 75,000 gallons. There were three service reservoirs. The chief feature of these reservoirs was that they had been constructed of reinforced concrete. The estimated cost of the works was £15,700, and they had been carried out for £15,400, or a saving of £300.

Sales of Stocks and Shares.

At the Mart, Tokenhouse Yard, E.C., last Tuesday, Messrs. A. & W. Richards offered for sale, by order of Directors, 1000 new ordinary £10 shares (5 per cent. maximum) in the Southend Water-Works Company; the dividend on similar shares for the year ended Dec. 31 last having been 4½ per cent. They were all sold at £10 to £10 5s. each. On the same occasion, some £10 fully-paid original ordinary 10 per cent. shares in the North Middlesex Gas Company fetched £21 each; and some additional ordinary shares of the same nominal value, but carrying 7 per cent. dividend, £14 15s. to £14 17s. 6d. apiece. A parcel of £200 of "A" 10 per cent. stock of the Hornsey Gas Company, carrying 12½ per cent. dividend, was sold for £247 10s. per £100; and £400 of 5 per cent. preference stock, at £116 per £100. Under instructions from trustees, some fully-paid £10 "B" preference shares (5 per cent.) in the Dorking Water Company fetched £12 to £12 2s. 6d. each. Next day, Messrs. Craske and Sons sold at Colchester a few original £20 shares in the Colchester Gas Company, on which 10 per cent. has been paid for many years, at £47 15s. and £48 apiece.

In the list of receiving orders made in London under the Bankruptcy Acts, 1883 and 1890, in last Friday's "Gazette," the name appears of Edward Oxenford Preston, described as a financier carrying on business at Tokenhouse Buildings, E.C. Readers of the "JOURNAL" are not altogether unfamiliar with the name.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The accounts of the Gas Department of the Corporation of Kilmarnock for the year which ended on May 15 have been issued. It is shown that the capital expenditure during the year was £12,429, which brought up the capital outlay till now to £113,074. The quantity of gas manufactured last year was 175,325,500 cubic feet—an increase of over 11 millions. This is the largest quantity ever sent out from the works in one year, the next highest having been in 1908, when the output was almost 120 millions. The coal carbonized amounted to 18,403 tons, which cost, on an average, 10s. 7d. per ton—a decrease of 5d. upon the previous year. The yield of gas per ton of coal was 9500 cubic feet—a decrease of 66 cubic feet. Unaccounted-for gas amounted to 17,373,662 cubic feet, equal to 9·9 per cent., as compared with 7·2 per cent. in the previous year. The gas sold thus amounted to 157,951,838 cubic feet—an increase of 5½ millions. The prices of gas were: To ordinary consumers, 2s. 6d. per 1000 cubic feet; to prepayment meter consumers, 2s. 8½d.; for gas-engines, 2s. 1d.; and for public lighting, 2s. 3½d. The revenue from gas was £20,568—an increase of £945. From ordinary consumers living within the burgh there was derived £13,686; from the prepayment meter consumers, £2412; from gas-engines, £890; and from public lighting, £1619. The revenue from tar was £2647, and from tar and sulphate of ammonia £3650. The expenditure amounted to £22,885, of which £9750 was for coal, £24 for benzol, £394 for lime, £1153 for maintenance of works, £4366 for wages, £2623 for distribution of gas, and £1424 for rents, rates, and insurances. The balance carried to the net revenue account amounted to £4514. From this sum there was paid £2519 in interest, and £1652 to the sinking fund, which now totals £3987. There was received from the hire of gas-stoves, fires, &c., £288. During the year, £3400 was written off the value of the old works, reducing the value to £8498. The value of the new Riverside works is stated to be £59,686. The value of meters, after allowing 10 per cent. for depreciation, is put at £1772. The expenditure upon gas-stoves, &c., during the year was £1325, raising the total under this head, to date, to £5153. An allowance of 10 per cent. is made upon them for depreciation; and the present value of cooking and heating appliances is entered at £3720. The accounts reveal that in ten years the annual output of gas has increased by 50 million cubic feet.

Bailie Bogle, the Convener of the Gas Committee of the Falkirk Corporation, in addressing the electors in the course of the present municipal election, sang the praises of the Gas Department in no unmeasured tune. He said that when they acquired the gas undertaking they had 4000 consumers, and sent out 78 million cubic feet of gas in a year; now they had 9000 consumers, and sent out 200 millions. The price of gas was now at the very lowest it had ever been. Two years ago there was an outcry over the gas-works; and he wished to state that he adhered entirely to every statement he made then regarding the works.

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OUR Barless Gas Fires are the latest embodiment of Maintenance principles. Here are some of the points to note.

By eliminating every impediment in the shape of front bars the acme of efficiency is attained.

"Pyro" Pillars (the "Fuel" of the Barless Fire) have a vastly increased radiating surface, and ensure remarkable results.

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Subsequent events had proved these statements to be correct. On May 15, 1908, they dispensed with what at that time had been the cause of all their troubles—a machine called a hot-coke conveyor. It had been intended to do good work, and probably would have done so if it had not been for disadvantageous circumstances. The retort-bench, on which the conveyor was hung, sank very considerably. The machine was the cause of the gas-works losing £5000. Its cost was £2200. In the year ending May 15, 1908, through bad stoking, caused by the men being unable to stoke so well by hand as had been done since by machine, the balance-sheet for the year showed a loss of £2456. It spoke volumes for the way in which the gas-works had been administered that they had been able to wipe off all their financial difficulties. There was no works in the district in which everything was so well managed, or in which the organization was so perfect. In May last, the capital outlay on the gas-works had been £207,000, for the redemption of which they had laid aside £40,000; leaving their indebtedness at £167,000. They paid yearly into their sinking fund £4500, the compound interest upon which doubled it in 21½ years. In 21½ years they would have from these yearly instalments of £4500, with compound interest, a sum of £187,750, which would be £20,750 more than they required to pay off their capital. They had, in addition, the Parkhouse, Grahamston, and canal bank sites (valued, say, at £10,000), which would make the credit balance £30,750. In 14¾ years, therefore, their savings would equal the net capital expenditure—and that not taking into account increased business and increased profits. In 14¾ years, he hoped that Falkirk would be in the happy position of having that large industrial undertaking standing in their books free. They had to meet £12,000 per annum—£7500 in interest, and £4500 as the yearly contribution to the sinking fund—representing 1s. 5d. per 1000 cubic feet of gas. At the end of 14¾ years this would be wiped off, and then the community would get gas at the cost of putting it into the holder, which at present was 11·48d. per 1000 cubic feet.

A special meeting of the Kirkcaldy Town Council was held on Tuesday for the purpose of considering a proposal to extend the time within which the Gas Arbiters may determine the matters referred to them till three months after the 31st inst., which is the time fixed by agreement. Doubt was expressed by more than one member of the Council as to the desirability of giving more time for the running up of expenses; but Mr. J. Wright, the Convener of the Gas Committee, explained that it was entirely on behalf of the town that the extension of time was asked. The Gas Company officials wanted the arbitration to have taken place on Oct. 17; but the town's Arbiter, knowing that he had not the case up in proper form, considered it necessary to have the time extended. They did not want their representative to go on without a proper case. "If they did so, the Company would declare a price, and the town would have to pay, and there would be no more about it." The Town Clerk favoured an extension of time; and the Council then unanimously agreed to it.

An unfortunate litigation about shares in the Cowdenbeath Gas Company, Limited, has been originated in the Court of Session. The pursuers, Mr. Alex. Waddell, of Dunfermline, and Mr. Forbes Waddell, Manager of the South Queensferry Gas Company, Limited, sue Messrs. James Hutton, cashier, 70, Polwarth Terrace, Edinburgh, and G. B. Tweedie, solicitor, Edinburgh, for £1010. In 1901, it is stated, the pursuers and Mr. Hutton acquired a controlling interest in the Cowdenbeath Gas Company, Limited. Mr. Hutton was appointed Chairman of the Company, and Mr. Tweedie was Law Agent. It is averred that, in terms of the agreement between them, when new shares in the Company were issued, the pursuers were entitled to a proportion of the new shares at par, and that in 1906 they should have had allotted to them 101 new shares of £10 each at par. As the shares of the Company have been selling at £20 each, they claim to have lost, by failure to allot to them, £10 per share. In defence, it is disputed that the agreement required that the pursuers should have part of the new shares allotted to them. Lord Mackenzie closed the record on Thursday. As his Lordship has been since transferred to the Inner House, the further hearing of the case will be before Lord Ormidale, his successor in the Outer House.

The Cowdenbeath Gas Company, Limited, somewhat more than a year ago became Contractors for the supply of gas to the village of Crossgates; their offer being preferred to that of the Corporation of Dunfermline. In giving the supply last winter, it was found to be difficult to maintain a satisfactory pressure; and to remedy this, a compressing plant, by the Bryan Donkin Company, Limited, has been fitted up at the gas-works, at a cost of over £200. It is reported to be working satisfactorily.

Gas exhibitions may be expected to "catch on" now that the Smoke Abatement Exhibition in Glasgow has concluded so successfully. An exhibition was opened in the Town Hall, Greenock, on Tuesday evening, and will be continued till Tuesday next. Bailie J. H. Taylor, the Convener of the Gas Committee, was in the chair, and the opening ceremony was performed by Provost M'Millan. The area of the hall has been filled with exhibits by various firms of gas lighting, heating, cooking, and labour-saving appliances. Examples are given of high-pressure gas lighting. Specimens of the smokeless fuel known as "Coalexld" are shown; and in the saloon artistically furnished residential rooms are lighted and heated by gas. Admission to the exhibition is free. Lectures and demonstrations in cookery are given by Miss E. M. Dods.

On the evening of last Wednesday, an accident occurred in the Corporation gas-works at Dumfries, through the unintentional production of a large quantity of acetylene gas and its ignition. Four men had been at work upon new machinery which is being introduced into the works. In the darkness, they obtained light from an acetylene torch. When they had finished their work, they proceeded to put out the light, the mode of doing which was to take the vessel containing the carbide out of the water. Just as it was lifted clear of the water, the bottom of the vessel gave way, and the carbide falling into the water a great quantity of gas was at once generated. This was ignited; and the four men were all burned somewhat severely.

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254.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Oct.* 22.

Sulphate of Ammonia.

Although the demand direct from consumers has fallen away to some extent, the week's requirements have been ample to absorb current production, and the keen competition for all parcels placed on the market has been continued at still hardening prices. At the close, the quotations for prompt delivery are £13 to £13 1s. 3d. per ton f.o.b. Hull, £13 1s. 3d. to £13 2s. 6d. per ton f.o.b. Liverpool, and £13 3s. 9d. to £13 5s. per ton f.o.b. Leith. For delivery this year and the first half of next year, manufacturers are very firm in their ideas, and decline to make sales unless they can realize approximately spot values; but for July-December, 1911, they would accept a substantial discount. Buyers, however, do not show much disposition to operate beyond the near position.

Nitrate of Soda.

The market for this article is still unchanged in either tone or value, and the quotations on spot remain 9s. 4½d. to 9s. 7½d. per cwt. for ordinary and refined qualities respectively.

LONDON, *Oct.* 24.

Tar Products.

The markets for tar products have been steady during the past week, though there has been rather an easier feeling all round regarding pitch. Business was done early in the week at one of the best ports on the east coast at 36s.; and since then some quantity has changed hands at 34s. In London, the principal sellers are practically out of the market; being exceedingly well sold, and under no necessity to place any further quantity for some time to come. They are asking 40s., which to all intents and purposes is a nominal price. It would, however, be possible to secure some small quantity of London pitch at 35s. to 36s. per ton. On the west coast, Scottish pitch makers are still very firm in their ideas; being pretty well sold. There has been a slightly easier feeling even here, as it is now possible to buy at 36s. 6d. to 37s. In Manchester, the majority of makers are asking very high prices, also Liverpool; but there are second-hand sellers at considerably under their figures. Benzol, 90 per cent., is firm, and for prompt delivery is fetching good prices; 6d. having been paid on the east coast in buyers' drums. In London, it is understood that 7d. is asked. Fifty-ninety per cent. benzol is steady; but there is not very much inquiry for same. Toluol is quiet, and consumers appear to be quite easy; while makers are well sold, and are quite prepared to wait before placing any further quantity. Solvent naphtha is unchanged; but it is still difficult to do business in London except at low prices. Heavy naphtha is steady, and consumers are offering 11¾d. for delivery all over next year; but makers decline to accept less than 1s. Carbolic acid is unchanged. Creosote continues very quiet. In the North, sales have been made at 1¾d. to 2d. at makers' works; while for delivery to consumers, 2¼d. has been pretty generally accepted, and in one case even under this figure.

The average values during the week were: Tar, 17s. 9d. to 21s. 3d. *ex* works. Pitch, London, 35s. to 35s. 6d.; east coast, 34s. to 35s.; west coast, 37s. to 38s. 6d. Clyde ports, 34s. to 35s. Manchester, 34s. to 35s. Liverpool. Benzol, 90 per cent., casks included, London, 7¾d. to 8d.; North, 7¼d. to 7¾d.; 50-90 per cent., casks included, London, 7¾d. to 8d.; North, 7½d. to 7¾d. Toluol, casks included, London, 9d. to 9½d.; North, 9d. Crude naphtha, in bulk, London, 3¾d. to 4d.; North, 3½d. to 3¾d.; solvent naphtha, casks included, London, 11½d. to 1s. 0½d.; North, 11d. to 1s.; heavy naphtha, casks included, London, 11¾d. to 1s.; North, 10½d. to 11d. Creosote, in bulk, London, 2⅜d. to 2½d.; North, 1¾d. to 2¼d. Heavy oils, in bulk, 2¾d. to 2⅞d. Carbolic acid, 60 per cent., casks included, east coast, 1s. 0½d.; west coast, 1s. Naphthalene, £4 10s. to £8 10s.; salts, 40s. to 50s., bags included. Anthracene, "A" quality, 1½d. to 1¾d. per unit, packages included and delivered.

Sulphate of Ammonia.

This article has been very firm throughout the past week, and prices finish at top practically. The principal Gas Companies are now quoting £12 12s. 6d. in any position, and state that they would find considerable difficulty in supplying prompt parcels. Ordinary London makers are asking £12 7s. 6d. to £12 10s. In Hull, £13 1s. 3d. to £13 2s. 6d. is about the value, and in Liverpool the same. In Leith, what little there is to be obtained could certainly not be secured at anything under £13 5s.; but the majority of makers are known to be sold out for this month. In Middlesbrough, £13 2s. 6d. is about the value.

COAL TRADE REPORTS.

Northern Coal Trade.

The demand for both steam and gas coals has shown a little improvement; but there is an ample supply in most classes. In the steam coal trade, the request is fair for this season. Best Northumbrians are quoted from 9s. 6d. to 10s. per ton f.o.b., second-class steams from 8s. 3d. to 8s. 9d., and steam smalls from 5s. 3d. to 6s. 6d. There is a steady output at the collieries, and the demand is a little fuller than it was. In the gas coal trade, the demand is now more rapidly increasing; and deliveries on the long contracts are heavy. Prices of Durham gas coals vary according to the quality. The usual classes are from 8s. 6d. to 9s. 9d. per ton f.o.b.; while for "Wear specials," up to 10s. 3d. is quoted. One or two contracts are announced; but they are for quantities that are small in comparison with those reported last week. There are offers for coal for some of the Italian ports; but the prices do not tempt sellers just at the present time, as the running contracts take up much of the output, and the quantities under these will be increased to the end of the year at least. In coke, the trade is brisk; but the larger output of gas coke keeps its price easy at 13s. 6d. to 13s. 9d. per ton f.o.b. for good quality.

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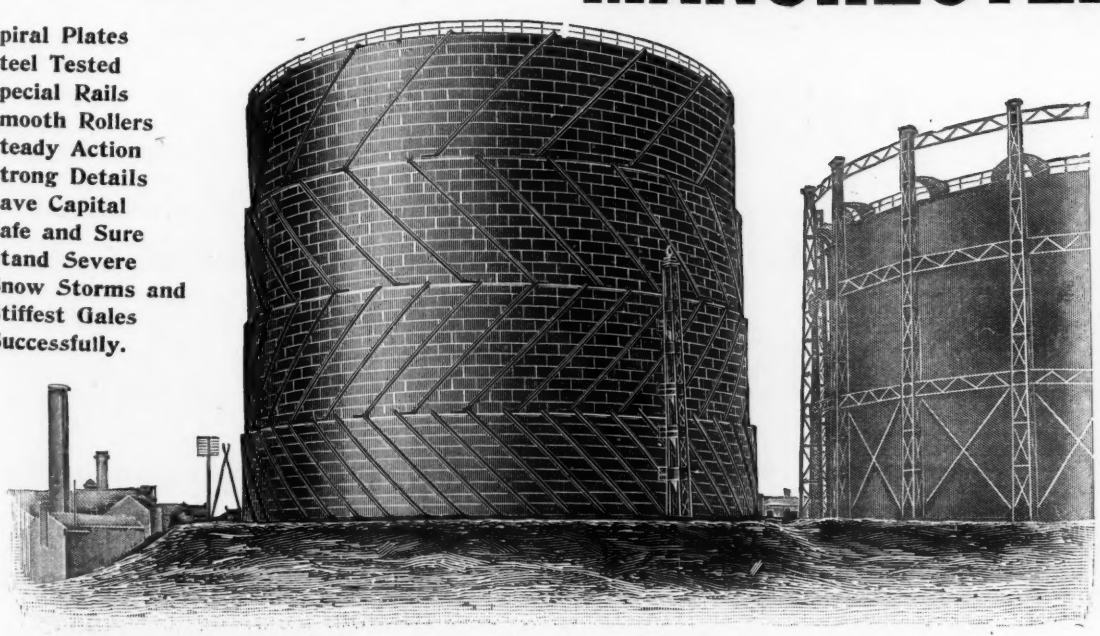

From a Photograph showing the conversion of a Two-Lift Guide Framed Holder to a Four-Lift Spiral Holder of 3½ million cubic feet capacity, for the Newcastle and Gateshead Gas Company, to Plans and Specifications of W. D. GIBB, Esq., M.Inst.C.E., Engineer.

Scotch Coal Trade.

The better side of the coal market is the foreign. The home market is affected by the indecision which continues to hang over the shipyard industries. This is expected to be soon overcome; but in the meantime it has a deadening influence upon trade. The prices now quoted are: Ell, 8s. 9d. to 10s. per ton f.o.b. Glasgow; splint, 9s. 3d. to 9s. 6d.; and steam, 8s. 9d. to 9s. The shipments for the week amounted to 329,337 tons—a decrease of 11,393 tons upon the previous week, and of 4197 tons upon the corresponding week last year. For the year to date, the total shipments have been 12,785,550 tons—an increase upon the corresponding period of 698,463 tons.

Public Lighting of Petersfield.—At the last meeting of the Petersfield Urban District Council, the Clerk (Mr. W. H. Robins) reported that Mr. J. H. Lyon's term of appointment as gas inspector had expired. The Chairman (Mr. C. W. Seward, J.P.) said he thought there had been a very great improvement in the lighting of the town generally speaking, and that it would be a wise thing for the Council to reappoint Mr. Lyon. It was unanimously decided to do this, on the same terms as before. The gas is supplied by the Petersfield Gas Company, of which Mr. F. E. Pye is the Manager.

Responsibility for Maintaining Water-Pipes.—Referring to the case of *Parnell v. Portsmouth Water-Works Company*, reported in our "Legal Intelligence," a local correspondent writes: "The success of the Company's appeal has created some astonishment, as householders at Portsmouth have always regarded their responsibility for repairs as being confined to pipes actually within the house; and this was borne out by the fact that a former Engineer of the Company actually refused to give permission to a consumer to have a turnkey for the tap which the Company some years ago had placed at the outer wall of every house in the borough."

Proposed Combination in the Scottish Tube Trade.—The following remarks appeared in a leading Scottish newspaper last Saturday: "Negotiations are stated to be on foot for the amalgamation of nearly all the principal Scottish iron and steel tube manufacturing companies into one concern. For some years competition in the trade has been excessively keen, profits have been at the vanishing-point, and the present movement is a reaction from that state of affairs. Eight or ten companies were represented at a conference on the subject held in Glasgow yesterday. Proposals were submitted and discussed at much length, and after protracted proceedings the meeting adjourned to allow opportunity for consideration of amended proposals. Matters, however, have not yet reached a stage at which it can be said with any confidence that the scheme will be realized." In another newspaper the announcement concludes with this remark: "If a Scotch combination is successfully brought about, the next move will be to approach English makers with a view to an Anglo-Scotch combination."

Gas for Improved Public Lighting at Faversham.

The General Purposes Committee of the Faversham Corporation discussed last Tuesday the subject of the improved lighting of the London Road. The Surveyor (Mr. S. P. Andrews) reported that the initial cost for the erection by the Gas Company of five lamps would be £4 5s. each (£21 5s.), and the annual charge for gas, maintenance of mantles, &c., £3 8s. per lamp. The lamps would have Sugg's latest type of inverted burners, each giving a light of 108-candle power; and they would become the property of the Corporation. Reporting upon the proposed adoption of electricity, the Surveyor said the cost of laying the cable would be £220, the annual charge for current and maintenance would be £4 per lamp, and each lamp would be of 100-candle power. On the line of the cable there were already six gas-lamps which would be converted if electricity were decided upon. The income from the eleven lamps would amount to £44; and another £10 might be added as probable income from private consumers. Alderman Child said the Council were faced with the fact that for £3 8s. they would get a better article than they would get for £4—a superior light at 12s. less cost. Under these circumstances, it must be best for the ratepayers to adopt gas; and he therefore moved that gas-lamps be supplied. Mr. Johnson proposed, as an amendment, that the Council do the lighting by electricity. He said that, allowing £10 as interest on the capital outlay of £220, there would be a clear income of £34 from the new lamps. Beyond this, they would be in a position to supply current to private consumers along the London Road, which they were not able to do at present. On the amendment being put, the voting was equal. It was then suggested that the matter should be deferred till another meeting, when there might be a larger attendance. Eventually, however, the Mayor (Mr. T. G. Gillett), who is the Chairman of the Electric Light Committee, gave his casting vote for gas, as the Council were, he said, practically agreed that this was best for the public lighting.

Collection of Water-Rents from Small Properties.—A long discussion took place at the last meeting of the Redruth District Council on the question of the collection of water-rents from small houses. The Water Committee recommended that, in the case of houses of not more than £10 annual value, the rents should be collected from the owners instead of the occupiers where the latter neglected to pay, and that the owners have notice to this effect. Considerable opposition was offered to the proposal, on the ground that it involved discrimination between the different owners of small property, and would entail on some the hardship of having to pay water-rents which should have been paid by the tenants. On the other hand, it was said that the amounts in many cases were so small as to be hardly worth collecting, and that about 100 persons each year did not pay. The remedy of cutting off the water was objectionable from a sanitary point of view. A majority of the Council, however, rejected the proposal to collect the money through the owner.

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Still Another "Eaton" Concern.

Under this heading, the "Financial News" last Friday called attention to the issue by the Secretary of the Patent Block Tar, Motor Oil, and Asphalte Company, Limited (Mr. E. T. Leaver), of a circular stating that he has been instructed, on behalf of the owners, "to offer for sale some shares in this (the parent) Company, owing to the vendors having taken nearly the whole of the purchase money due to them in shares, and are realizing some to further financially assist the Company until completion of negotiations now pending to acquire the present Company's interest, when each shareholder would receive about £2 in cash or shares for every £1 share now purchased." Mr. Leaver explains that "a draft scheme of the intended larger Company is under consideration, under which it is the intention to put up new works in England and abroad to produce under the Syndicate's patent process, at first, about 100,000 tons of material yearly, which the Company's representative reports he can himself book orders for, and which he estimates would result in a net profit to the Company of about £15,000, which on a capital of £50,000 would provide dividends of 30 per cent.; leaving about 2 million gallons of oil recovered under the patent process—an important saleable asset. As soon as the intended works can be erected I believe the shares will be unobtainable except at a high premium, as instanced by reference to the enormous value of the original shares (such as are now offered) of other parent companies holding patents for a monopoly on which large industries have been built up; and meanwhile the sellers guarantee interest on the shares you may purchase at the rate of £10 per cent. for twelve months, payable in advance, by which time it is expected the new Company will be formed and a considerable profit received upon the shares now offered." Our contemporary points out that the Directors of the Company are Sir C. B. H. Soame, Bart., and Mr. H. W. L. Way, and adds: "They should be able to co-operate effectively, since they have both been on the directorate of the Water and Gas Debenture and Share Investment Trust, Limited, in company with no less a person than Mr. Eaton himself."

Slough Water-Works Purchase.—The Slough Urban District Council have unanimously decided to proceed with the purchase of the undertaking of the Slough Water Company, and to promote in the next session of Parliament a Bill authorizing them to do so. In the Slough Water Act of this year, the Council got a clause inserted giving them the right of purchase provided they promoted a Bill for the purpose within a certain period.

The Recent Road Subsidence at Slough.—As an outcome of the road subsidence at Slough on the 30th of August, the Town Council have received from the Water Company a claim for £29 16s. 9d., made up as follows: Repairing broken main, £3 11s. 9d.; hire of horses, 19s. 6d.; estimated waste of water, 96,000 gallons, at 1s. 6d. per 1000 gallons, £7 4s.; surveyor's and engineer's fees, £18 1s. 6d. The last item, compared with the first, seems extraordinary.

Bucks and Oxon District Gas Company, Limited.

A creditors' petition presented by the Vulcan Stove Company, Limited, for the compulsory winding-up of this Company, came before Mr. Justice Neville last Tuesday. Counsel stated that the petitioners were judgment creditors for £398, and were supported by debenture-holders to the amount of £5000. The Company was incorporated in May, 1907, for the purpose of supplying gas to certain districts in Bucks and Oxon. In June last, resolutions were passed for voluntary liquidation and the appointment of Mr. White as liquidator. On the 12th of July, a meeting of creditors was held, at which it was resolved unanimously that it was desirable the Company should be wound up compulsorily. The petition had the support of the Liquidator. His Lordship asked whether the petition made a case for compulsory liquidation. Counsel replied that it did, and said it was presented after the resolution had been come to for voluntary liquidation. There was no opposition to the petition; and there was no appearance for the Company. His Lordship made the usual order for compulsory liquidation.

Portchester Water Supply.—The required public supply of pure water to Portchester is still under discussion; and at a recent parish meeting a computation was given that this could be obtained from the Portsmouth Water Company by laying a main along two miles of road. The cost would probably amount to £1200; and the consumption of water daily is estimated at 16,000 gallons. The Fareham authorities, who govern the district, affirm that the expense of laying mains from the town would be too great for them to undertake the work.

Troon Water Supply.—The Town Council of Troon have just inspected their new water-works at Loch Bradan. The loch is being raised 8 feet above its normal level, and, after junction with an adjoining loch, will give a storage capacity of 400 million gallons. The valve tower and screening chamber of granite and whinstone are finished; and a concrete breastwork, founded on the solid rock, is nearing completion. The new water supply is expected to be available in six weeks' time. The pipes, which are now all laid, pass through Dalmellington, Patna, and Waterside.

Beverley Water Supply.—At a recent meeting of the Beverley Town Council, it was reported in the minutes of the Gas and Water Committee that the Manager had submitted particulars of a trial bore put down in the proposed new site for the water-works, together with a report upon the result of a chemical analysis of a sample of water taken from the bore, which showed it to be of a very satisfactory quality. The result of the bacteriological analysis had not been received. The Committee resolved that the particulars of the boring and analysis be forwarded to Mr. Baldwin Latham, and that, subject to his approval, he be requested to prepare the necessary specification and drawings for the proposed new well; that tenders be invited by advertisement for the execution of the work; and that the Town Clerk obtain quotations for a proposed advance of £2711 for carrying out the work.

Competition.

popularity of our "A.B.C." Fires and how they appeal to results at a recent Exhibition. Out of a total number of eight obtained, approximately, 35 per cent. of the whole of the orders 600 Stoves, all of which were despatched immediately on receipt prepared for the largest Gas Fire Season on record—holding and day.

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To Solve the Smoke Problem.

Under the above heading, the "South Wales Daily News" publishes the following: "The latest addition to fuel manufacture, which will be in full working order at Swansea in about three weeks' time, is to solve the smoke question, to generate steam easily and effectively, to answer household purposes, and at the same time to possess the all-important virtue of economy. There are being completed on one of the most convenient sites at the new King's Dock, Swansea, by the Welsh Fuel Company, patent fuel works of an extensive character, which will be capable of an output of 400 tons a day. For many years, inventors have been engaged in solving the problem of utilizing what is generally regarded as a waste product—anthracite duff. It is generally agreed that it is by the incorporation of anthracite that the smoke difficulty in fuel can alone be completely overcome. Hence the present venture (which has passed the experimental stage) will be watched with interest. Prudent business men, the Directors (with Mr. Joseph Birkenshaw, the well-known colliery proprietor, at their head), before launching on the undertaking, tried every conceivable experiment so as to be thoroughly satisfied of the commercial value of the invention they have adopted. They tried it in steam raising, both afloat and ashore, when it is claimed it more than answered anticipations. They tested its effect in the household grate, and found it free from smoke, dust, and smell. Moreover, it has the important quality of coking. They have also tested it from an economical standpoint to the extent of being satisfied it can be sold at least 25 per cent. cheaper than coal. The invention is known as the Morris; and Mr. Vincent Groom is the Managing-Director, under whose supervision the new works have been erected."

Southampton Gaslight and Coke Company.—The report of this Company for the half year ended June 30 last states that, after payment of debenture interest and other charges, the profit and loss account shows a balance available for dividend of £15,989; and the Directors recommend that the maximum dividends, less income-tax, amounting to £13,563 for the half year, be paid on Nov. 4, leaving £2426 to be carried forward.

Water-Works Purchase Question at Southampton.—The Southampton Town Council on Monday of last week held a special meeting to take into consideration the report of the Parliamentary Committee with reference to the proposed purchase by the Corporation of the South Hants water undertaking. In their report, the Committee recommended that the purchase should be effected. The Mayor (Alderman C. J. Sharp) pointed out that the Corporation had previously introduced a Bill into Parliament to enable them to acquire the concern; but on a technicality it was thrown out, and a second Bill for the acquisition of a part of the undertaking was also thrown out. After some discussion, the Corporation adopted the report.

Sad Fatality at Duffield.—A young man named Ernest Wilkinson, twenty years of age, met his death last Friday week at Duffield, near Derby, under sad circumstances which were explained at the inquest. From the evidence of the father, it appeared that water had been put in the meter during the evening; but the plug was not replaced. The deceased slept alone, with his door slightly open. When Mr. Wilkinson got up on the Saturday morning, he found the house full of gas. Thinking it proceeded from his daughter's bedroom, he entered, and the girl swooned in his arms. Handing her to the care of his wife, he went to his son's bedroom, to find him lying in bed, suffocated by gas. The window was closed. Witness afterwards found that the bottom plug of the gas-meter had been left out, and gas was escaping. Dr. Morrison stated that the deceased was asphyxiated by gas while asleep. Had the window been open—especially at the top—he would have been saved. The girl escaped because she was lying on the floor the greater part of the night. A verdict of "Death from asphyxiation by gas while asleep" was returned.

Colonial Gas Association, Limited.—The accounts to be presented at the annual general meeting of the Association next Tuesday show that, after writing off £997 for depreciation of works, there remains a profit of £6612 on the working in the year ended the 30th of June last. Adding the balance brought forward (£1068), and deducting the interim dividend (£3463), there is left a sum of £4217 available for distribution. The Directors recommend the payment of a final dividend of 3½ per cent., making 5½ per cent. for the year, free of income-tax, amounting to £2966, and carrying forward £1251. They report a further expansion in the sale of gas in the twelve months covered by the accounts; the average increase having been upwards of 11 per cent. compared with the preceding year. Owing chiefly to the disastrous coal strike in Australia, which lasted for more than five months, the accounts show a large increase in the cost of raw material. But for this, the Directors state, the profit would have exceeded that of the year 1908-9. They announce with regret the decease, already noticed in our columns, of their colleague Mr. A. Godwin Hammack, who was a Director for more than fifteen years; and they state that it is not proposed at present to fill up the vacancy.

Stokers' Wages at St. Ives (Cornwall).—At a meeting of the St. Ives Town Council on Monday last week, an application was received from the stokers at the gas-works for an increase of wages from 26s. to 29s. 3d. per week; and the Gas Committee recommended that an advance be made to 27s. 6d. Mr. Uren asked if this would satisfy the men; and the Gas Manager (Mr. Hearson) replied that it would not. He added that he should be glad if the Council would give them what they asked, as otherwise there would be similar trouble every eighteen months. Mr. J. Pearce said the Council had to consider the ratepayers and gas consumers as well as the employees. The Committee thought 27s. 6d. a week good wages for the work done. Mr. G. Williams expressed the opinion that 78 hours a week were too many for the men to work. Mr. Pearce said if the matter were referred back, the Council must be prepared to pay 28s. a week for an extra man. Mr. Blight, the Chairman of the Committee, said the stokers wanted the same pay for eight hours a day as for twelve hours. Mr. Uren proposed, and Mr. Daniel seconded, that they be paid 29s. 3d. a week. The voting was even; and the Mayor (Lieut.-Col. H. W. Williams) gave his casting vote in favour of the proposition.

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Port Rates on Goods.—It is announced by the Port of London Authority that on and after Tuesday next port rates will be payable in respect of all goods imported or exported into or from the Port of London from or to parts beyond the seas or coastwise. Each payment must be accompanied by a bill giving particulars of the goods in respect of which it is made. Copies of the list of rates can be obtained at No. 109, Leadenhall Street.

A Too Generous Electric Power Company.—According to a paragraph in the "Newcastle Daily Chronicle," the Directors of the Cleveland and Durham Electric Power Company, Limited, of Middlesbrough, have issued a circular to shareholders calling an extraordinary meeting to be held at Newcastle to-day, when resolutions will be proposed for the reduction of the capital from £1,000,000 to £700,000, by the cancelling of capital lost or unrepresented by available assets. Upon this reduction taking effect, it is proposed to make a number of further alterations in the shares. This is the Company which arranged to give free public lighting to the Consett Urban District Council, to commence about two years hence. With a lost capital of £300,000, the gift is rather superfluous, one would think.

Gas Lighting during "Shopping Week" in Reading.—Reflecting upon the many successful exhibitions made in Reading during the recent "shopping week," a writer in the "Reading Standard" last Saturday said the brilliancy of the illuminations could not be overlooked. Friar Street was a blaze of light, thanks to the enterprise of the Reading Gas Company. The exterior of their extensive show-room was beautifully illuminated at night; and large crowds were attracted to the spot, watching, as the writer says, "the twinkling fairy lights outlining the outside of the building and the brilliant lights within." A representative of the paper entered the show-room with the rest of the public, and was agreeably surprised to see many improvements in gas lighting. At the time of his visit there were 95 incandescent lights burning, and, he says, the scene was "intensely interesting." He describes the contents of the show-room.

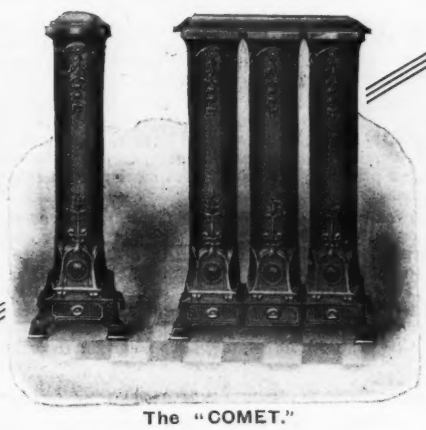
Gas Lighting in Poland.—The annual British consular report upon the trade of Poland shows that, notwithstanding the large number of new plants for electric lighting, there was a considerable increase in the gas installations at Warsaw during the year. The price of gas—4s. 2½d. per 1000 cubic feet—remained the same. The chemical works attached to the gas-works at Warsaw developed considerably; the chief product being sulphate of ammonia, for which there is an ever-increasing demand for artificial manure. It is proposed to construct new gas-works at Lodz. With the exception of Tomaszow, in the province of Radom, there was no development of the gas industry in other provincial towns. Local coal cannot be used for making gas, for which British coal must be imported. Consequently electric plants, for which Russian coal can be employed, are preferred for lighting purposes. In Tomaszow, a concession for building gas-works has been granted for 4½ years to a private company. It is proposed, to begin with, to erect 414 lamps in the streets.

The Burden of Electric Lighting at Redditch.—The proceedings at the meeting of the Redditch Urban District Council last Tuesday were not of a character to cause pleasure to the ratepayers, inasmuch as these long-suffering individuals have to meet a further increase in the general district rate to the extent of 3d. in the pound for the half year ending the 31st of March next. For the six months lately closed, the rate was 2s. in the pound; and for the preceding period 1s. 10d. The electricity supply undertaking is the cause of the trouble. A decrease in the revenue and the necessity of a prompt repayment of a bank overdraft compelled the Council to ask for £1500 from the rates in support of the undertaking. A rate of 1d. in the pound produces rather less than £200; and as the demand upon the rates to keep the undertaking going is now equal to £3000 a year, it means that this business is annually absorbing an amount equal to a rate of 1s. 3d. or 1s. 4d. in the pound. Referring to the position, a local paper says: "Think of it ye struggling tradespeople, who, in the face of higher rents and diminished trade, are scarcely able to make both ends meet."

Prices of Gas and Boiler Tubes in Berlin Last Year.—The latest British consular report on the trade of Berlin contains the following remarks in regard to gas and boiler tubes: "The depression in this market continued during 1909, and became more acute. The prices for wrought-iron tubes underwent a reduction of 10 per cent. net; and though a slight improvement set in during the third quarter of the year (more especially for galvanized tubes), a further abatement had to be made towards the end of the year, in consequence of a decreased demand and of fresh competition that suddenly sprang up. The dissolution of the pig-iron syndicate and the competition that ensued between western and eastern works, led to a further reduction in prices for cast-iron pipes during the first half of the year, despite the fact that those at the end of 1908 were far from being satisfactory. . . . In general, sales were normal, being rather better during the first half of the year than the second. The Association formed for the sale of gas-pipe joints among manufacturers enabled the normal prices to be adhered to during the year under consideration. Wrought-iron gas-pipe joints have come down in price, and business in this commodity is extremely unsatisfactory in consequence of keen competition and the producers not being organized."

In a report to the Sunbury Urban District Council, regarding a test of the gas which he had made, Mr. P. Egerton stated that he found the apparatus for testing the illuminating power and the room in which it was installed at the Company's works in a very dirty and neglected condition. He was not able, therefore, to make a test which he could consider to be accurate. It was resolved to issue a summons against the Gas Company.

A Sub-Committee of the Preston Streets and Buildings Committee, who were appointed to receive a deputation from the Preston Gas Company, have reported the result of an interview, when the Company stated that it was their intention to apply for a Provisional Order to reduce the illuminating power of the gas from 18 to 14 candles. Proposals were submitted to the deputation for the consideration of the Corporation; and the Committee decided to engage an expert to advise them on the matter.



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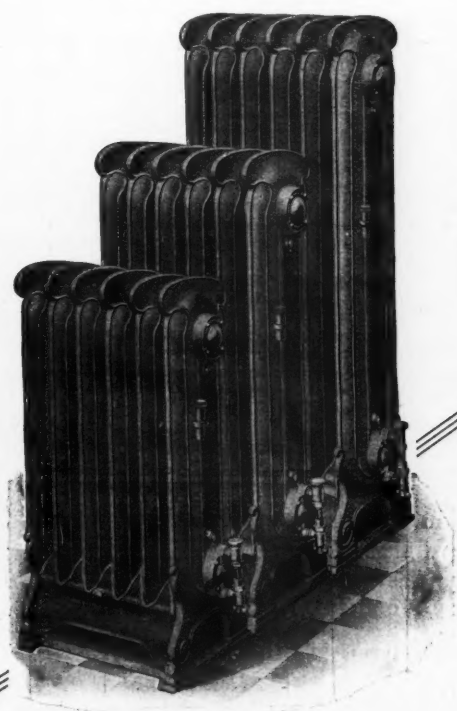

Messrs. James Milne and Son, Limited, ask us to contradict a rumour that has reached them to the effect that they are closing-down their London branch. They add: "We are hoping to go stronger than ever, and certainly have no idea of closing it."

The advertisement columns of the "JOURNAL" last week contained an announcement that the Redhill Gas Company were inviting tenders for an issue of £5000 of ordinary "B" stock, which will rank for a standard dividend of 5 per cent. per annum, subject to the sliding-scale. The minimum price is £101 per £100 of stock; and tenders must be sent in by noon on Tuesday next.

The Oswaldtwistle Urban District Council, who own their own gas-works, recently invited ratepayers desirous of using electricity for lighting purposes, to notify the department. The response, however, has been so meagre that last week the Sub-Committee specially appointed to negotiate with the Accrington Corporation for the supply of electric current to Oswaldtwistle, informed the latter Council that they could not recommend them to pursue the matter further. The Accrington Corporation's terms, too, have not been recommended for acceptance.

According to the annual consular report upon the trade of Bavaria, which has just been issued, the arc lamp industry has been affected by the increasing competition of powerful gas-lamps, due to the low price of the gas in proportion to the amount of light obtained. The Consul adds: "Especially for street lighting, the powerful gas-lamps have lately gained the superiority; whereas the lighting by electricity (arc lamps) has fallen off."

In replying to a vote of thanks for the manner in which he had occupied the chair of the Liverpool Corporation Lighting Sub-Committee, Mr. W. W. Walker mentioned that, in addition to the ordinary work of street lighting, gas and meter testing, &c., carried out during the year, the scheme of automatically lighting street-lamps had advanced a further stage—1000 more controllers having been fixed. This had been accomplished without dismissing any of the permanent staff. There were now 2063 controllers in use; an annual saving of approximately £700 having been effected. The mileage of electrically-lighted streets had been increased from 5½ to 6¾. The reduction in the price of gas by 1d. per 1000 cubic feet meant an annual saving in the street-lighting bill of £725.

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GAS GENERATORS. Carpmael and Co., Southampton Buildings, W.C.

Stocks and Shares.

GAS METER COMPANY (BY AUCTION). Nov. 8.
LOWESTOFT WATER AND GAS COMPANY (BY AUCTION). Nov. 8.
REDHILL GAS COMPANY (BY TENDER). Nov. 1.
TUNBRIDGE WELLS GAS COMPANY (BY TENDER). Nov. 5.

TENDERS FOR

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BUDAPEST CORPORATION. Tenders by Jan. 28.

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SHEFFIELD GAS COMPANY. Tenders by Nov. 8.

Gas Generating Equipment.
BUDAPEST CORPORATION. Tenders by Jan. 28.

Gasholders.
BUDAPEST CORPORATION. Tenders by Jan. 28.

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No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

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GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 246.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
1,551,868	Stk.	Oct 14	5	Alliance & Dublin Ord.	86–88*	..	5 13 8
374,000	Stk.	July 14	4	Do. 4 p.c. Deb.	95–98	..	4 1 8
200,000	5	May 12	7	Bombay, Ltd.	6⅞–6⅞	..	5 5 8
40,000	5		7	Do. New, £4 paid	5–5¼	..	5 6 8
50,000	10	Aug. 31	15	Bourne- mouth Gas and Water	10 p.c.	..	5 1 8
					B 7 p.c.	..	4 3 7
311,810	10	"	7		Pref. 6 p.c.	..	3 18 8
75,000	10	"	6				
380,000	Stk.	Aug. 12	12½	Brentford Consolidated	246–249	..	5 0 5
330,000	"	"	9¼	Do. New	184–186	..	5 2 2
50,000	"	"	5	Do. 5 p.c. Pref.	—	..	—
206,250	"	June 10	4	Do. 4 p.c. Deb.	99–101	..	3 19 3
220,000	Stk.	Aug. 31	11	Brighton & Hove Orig.	215–218	..	5 0 11
246,320	"		8	Do. A Ord. Stk.	157–160	..	5 0 0
460,000	20	Sept. 29	10⅝	British	44–45	..	4 12 4
109,000	Stk.	Aug 12	6	Bromley, A 5 p.c.	117–119	..	5 0 10
165,700	"	"	4¼	Do. B 3¼ p.c.	88– 90	..	5 0 0
82,278	"	"	5¼	Do. C 5 p.c.	107–109	..	5 0 11
55,000	"	June 29	3½	Do. 3½ p.c. Deb.	85–87	..	4 0 6
250,000	Stk.	"	4	Buenos Ayres 4 p.c. Deb.	97–99	..	4 0 10
100,000	10	—	—	Cape Town & Dis., Ltd.	3–4	..	—
100,000	10	—	—	Do. 4½ p.c. Pref.	4⅜–5¼	..	—
50,000	50	May 3	6	Do. 6 p.c. 1st Mort.	50½–51½	..	5 16 6
100,000	Stk.	June 29	4½	Do. 4½ p.c. Deb. Stk.	88–90	..	5 0 0
157,150	Stk.	Aug. 12	5	Chester 5 p.c. Ord.	109½–111½	..	4 9 8
1,513,280	Stk.	"	5 5/16	Commercial 4 p.c. Stk.	105–108	..	4 16 3
560,000	"	"	5	Do. 3½ p.c. do.	101–103	..	4 17 1
475,000	"	June 29	3	Do. 3 p.c. Deb. Stk.	79–81	..	3 14 1
800 000	Stk.	June 10	5	Continental Union, Ltd.	96–98	–1	5 2 0
200,000	"	"	7	Do. 7 p.c. Pref.	137–139	..	5 0 9
492,270	Stk.	—	5¼	Derby Con. Stk.	122–124	..	4 8 9
55,030	"	—	4	Do. Deb. Stk.	104–105	..	3 16 2
148,995	"	Oct. 14	5	East Hull 5 p.c. Ord.	103–105*	..	4 15 3
486,090	10	July 14	12	European, Ltd.	24–24½	+⅛	4 18 0
354,060	10	"	12	Do. £7 10s. paid.	17⅜–18½	..	4 18 8
16,179,445	Stk.	Aug. 12	4⅜	Gas light and Coke	4 p.c. Ord.	105–106	–⅛	4 8 0
					3½ p.c. max.	87–89	..	3 18 8
					4 p.c. Con. Pref.	104–106	..	3 15 6
					3 p.c. Con. Deb.	8 –92	..	3 13 2
2,600,000	"	"	3⅜					
4,062,235	"	"	4					
4,531,705	"	June 29	3					
258,740	Stk.	Sept. 15	5	Hastings & St. L. 3½ p.c.	92–94	..	5 6 5
82,500	"	"	6¼	Do, do. 5 p.c.	114–116	..	5 12 ·
70,000	10	Oct. 14	11	Hongkong & China, Ltd.	17–17⅛*	..	6 5 8
131,070	Stk.	Sept. 15	7⅜	Ilford A and C	145–148	..	4 19 8
65,780	"	"	5⅜	Do. B	112–114	..	5 3 1
65,500	"	June 29	4	Do. 4 p.c. Deb.	98–100	..	4 0 0
4,940,000	Stk.	May 12	9†	Imperial Continental	187–189	..	4 15 3
1,235,000	Stk.	Aug 12	3⅜	Do. 3½ p.c. Deb. Red.	94–96	..	3 12 11
200,242	Stk.	Aug. 31	6	Lea Bridge Ord. 5 p.c.	120–122	..	4 18 4
561,000	Stk.	"	10	Liverpool United A.	220–222	..	4 10 1
718,100	"	"	7	Do. B	162–164	..	4 5 4
306,083	"	June 29	4	Do. Deb. Stk.	104–106	..	3 15 6
75,000	5	June 29	6	Malta & Mediterranean.	4⅜–4⅝	..	6 3 1
560,000	100	Oct. 1	5	Met. of 5 p.c. Deb.	99–101	..	4 19 0
250,000	100	"	4½	Melbourne 4½ p.c. Deb.	99–101	..	4 9 1
541,920	20	May 27	3½	Monte Video, Ltd.	12½–13	..	5 7 8
1,775,892	Stk.	July 28	4⅛	Newc'tle & G'tesh'd Con.	101¼–102½	..	4 5 4
529,435	Stk.	June 29	3½	Do. 3½ p.c. Deb.	90–91	..	3 16 11
55,940	10	Aug. 31	7	North Middlesex 7 p.c.	15⅝–14⅝	..	4 16 7
300,000	Stk.	Apl. 29	8	Oriental, Ltd.	138–140	..	5 14 4
60,000	5	Sept. 15	8	Ottoman, Ltd.	6–6¼	..	6 8 0
31,800	53	Aug. 31	13	Portsea Island A.	131–133	..	5 3 0
60,000	50	"	13	Do. B.	124–126	..	5 3 2
100,000	50	"	12	Do. C.	117–119	..	5 0 10
114,800	50	"	10	Do. D and E.	102–104	..	4 16 2
398,490	5	Apl. 29	7	Primitiva Ord.	7⅞–7⅞	..	4 11 10
796,980	5	June 29	5	Do. 5 p.c. Pref.	5 7/16–5 7/16	–1/16	4 11 11
488,900	100	June 1	4	Do. 4 p.c. Deb.	97–99	..	4 0 10
312,650	Stk.	June 29	4	River Plate 4 p.c. Deb.	97–99	..	4 0 10
250,000	10	Sept 29	9	San Paulo, Ltd.	15½–15⅝	..	5 14 3
62,500	10	"	6	Do. 6 p.c. Pref.	11¼–11⅝	..	5 2 2
125,000	50	July 1	5	Do. 5 p.c. Deb.	51–52	..	4 16 2
135,000	Stk.	Aug. 31	10	Sheffield A	229–231	..	4 6 7
209,984	"	"	10	Do. B	229–231	..	4 6 7
523,500	"	"	10	Do. C	229–231	..	4 6 7
70,000	10	Oct. 14	6	South African	10½–11¼*	..	5 6 8
6,429,895	Stk.	Aug. .2	5/9/4	South Met., 4 p.c. Ord.	121–123	..	4 8 10
1,895,445	"	July 14	3	Do. 3 p.c. Deb.	80–82	..	3 13 2
209,820	Stk.	Aug. 31	8	South Shields Con. Stk.	155–157	..	5 1 11
605,000	Stk.	Aug. 12	5⅜	S'th Suburb'n Ord. 5 p.c.	120–122	..	4 12 9
60,000	"	"	5	Do. 5 p.c. Pref.	120–122	..	4 2 0
117,058	"	July 14	5	Do. 5 p.c. Deb. Stk.	121–123	..	4 1 4
502,310	Stk.	May 12	5	Southampton Ord.	110–112	..	4 9 3
120,000	Stk.	Aug. 12	7	Tottenham A 5 p.c. and B 3½ p.c.	141–143	..	4 17 11
483,940	"	"	5⅜		112–114	..	4 16 6
149·470	"	June 29	4	Edmonton 4 p.c. Deb.	97–99	..	4 0 10
182,380	10	June 10	8	Tuscan, Ltd.	9–9¼	..	8 8 6
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	98–100	..	5 0 0
236,476	Stk.	Aug. 31	5	Tynemouth, 5 p.c. max.	112–114	..	4 7 9
255,636	Stk.	Aug. 31	6¼	Wands- worth B 3½ p.c.	139–141	..	4 15 9
85,766	"	June 29	3	3 p.c. Deb. Stk.	73–75	..	4 0 0

Prices marked * are "Ex div." † Next dividend will be at this rate.

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Offers are invited, which should be addressed to me the undersigned before the 7th prox.
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James Amphlett,
Clerk.

Council Offices, Colwyn Bay,
Oct. 19, 1910.

THE Proprietor of the Patent No. 8397 of 1908, relating to GAS GENERATORS, desires to enter into Negotiations with one or more Firms in Great Britain for the Grant of LICENSES to Manufacture under Royalty.
Inquiries to be addressed to Messrs. Carpmael and Co., 74, Southampton Buildings, London, W.C.

Mag. Numbers 97,446/910.II; 97,447/910.II, and 97,448/910.II.

CAPITAL AND RESIDENCE OF BUDAPEST.

SUPPLY OF GASOMETERS, COAL AND COKE TRANSMISSION, AND GAS GENERATING EQUIPMENTS.

THE Council of the Capital and Residence of Budapest are prepared to receive TENDERS for the Supply of Two GASOMETERS, each of a volume of 100,000 m³, a COAL and COKE TRANSMISSION EQUIPMENT and a GAS GENERATING EQUIPMENT for the Central Gas-Works of the Capital and Residence of Budapest.

Tenders must be handed in on the 28th day of the month of January, 1911, 12h merid., to the Chief, or his Substitute, of the IInd Section (Public Buildings) of the Council of the Capital and Residence (Budapest, IV. ker. Városház utcza, Központi Városház, II. emelet 257 ajtó.).

Specification, with Terms, Conditions, and Drawings, may be Inspected at the Offices of the Administration of the Gas-Works of the Capital and Residence (Budapest, IX. Lónyay utcza 9, I emelet 4 ajtó.); the Specification and Drawings concerning the Gasometers to be bought at the Price of Crowns 50, those for the Coal and Coke Transmission, as well as for the Gas Generating Equipments, at the price of Crowns 100 per Set.

The same Administration will give also every explanation required.

The Council of the Capital and Residence of Budapest.

Budapest,
Oct. 15, 1910.

FIRE-CLAY GOODS.

THE Directors of the Sheffield United Gaslight Company invite TENDERS for the Supply of SILICA and FIRE-CLAY GOODS required at their Works during the next Twelve Months.
Specifications and Forms of Tender may be obtained upon Application to the Company's Engineer, Mr. J. W. Morrison, Commercial Street, Sheffield.
The Directors do not bind themselves to accept the lowest or any Tender.
Sealed Tenders, marked "Tender for Fire-Clay Goods," must be delivered by post to Mr. Hanbury Thomas, Managing Director, not later than the first post on Tuesday, Nov. 8.

Wm. Hamby,
Secretary.

Commercial Street,
Sheffield, Oct. 18, 1910.

THE Proprietor of the Patent No. 24,463, of 1907, for "IMPROVEMENTS IN ACETYLENE GAS GENERATORS," is desirous of entering into Arrangements, by way of LICENSE and otherwise, on Reasonable Terms, for the purpose of EXPLOITING the same and ensuring its Full Development and Practical Working in this Country.
All Communications should be addressed in the first instance to Haseltine, Lake, and Co., Chartered Patent Agents and Consulting Engineers, 7 & 8, Southampton Buildings, Chancery Lane, London, W.C.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MESSRS. A. & W. RICHARDS beg to notify that their SALES BY AUCTION of NEW CAPITAL ISSUED UNDER PARLIAMENTARY POWERS, and of STOCKS and SHARES belonging to EXECUTORS and other PRIVATE OWNERS in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES, take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.
Terms for Issuing New Capital, and also for including other Gas and Water Stocks and Shares in these Periodical Sales, will be forwarded on Application to Messrs. A. & W. Richards, at 18, Finsbury Circus, E.C.

By order of the Directors of the
LOWESTOFT WATER AND GAS COMPANY.

NEW ISSUE OF 400 ADDITIONAL ORDINARY £10 SHARES.
AND
£1000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MESSRS. A. & W. RICHARDS will SELL THE ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, Nov. 8, at Two o'clock, in Lots.
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By order of Executors and Other Owners.
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THE REDHILL GAS COMPANY.

SALE OF ORDINARY "B" STOCK.

NOTICE is Hereby Given, that it is the intention of the said Company to SELL BY TENDER £5000 of ORDINARY "B" STOCK of and in the Redhill Gas Company. The last day for the reception of Tenders will be Tuesday, the 1st of November, 1910, at Twelve o'clock at Noon.
Forms of Tender, with Particulars of Sale and Conditions of Tender attached, can be had upon Application at the Company's Office, Brighton Road, Redhill.

By order of the Directors,
Horace Long,
Secretary.

Redhill, Surrey,
Sept. 30, 1910.

TUNBRIDGE WELLS GAS COMPANY.

ISSUE OF ADDITIONAL CAPITAL.

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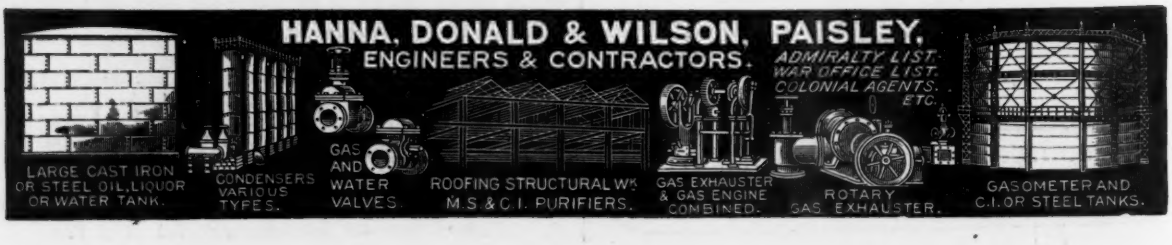
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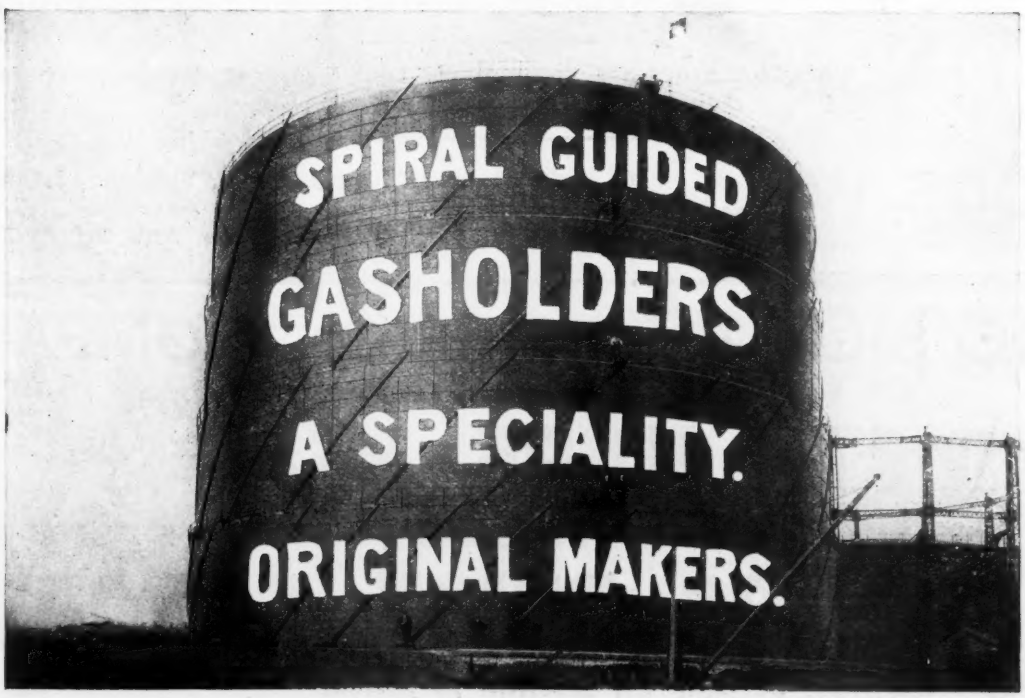

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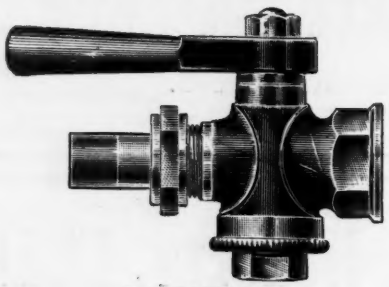

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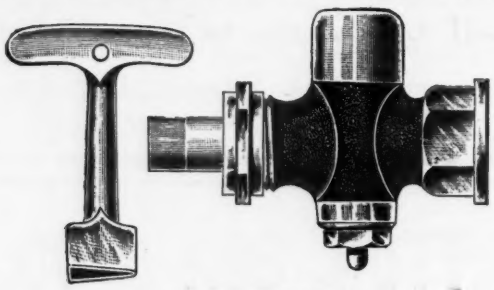

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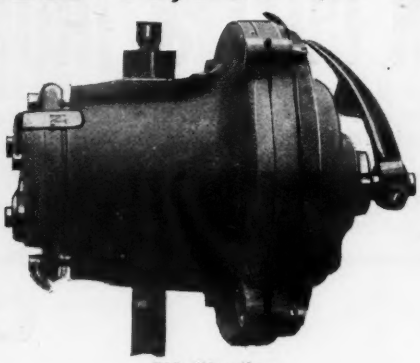

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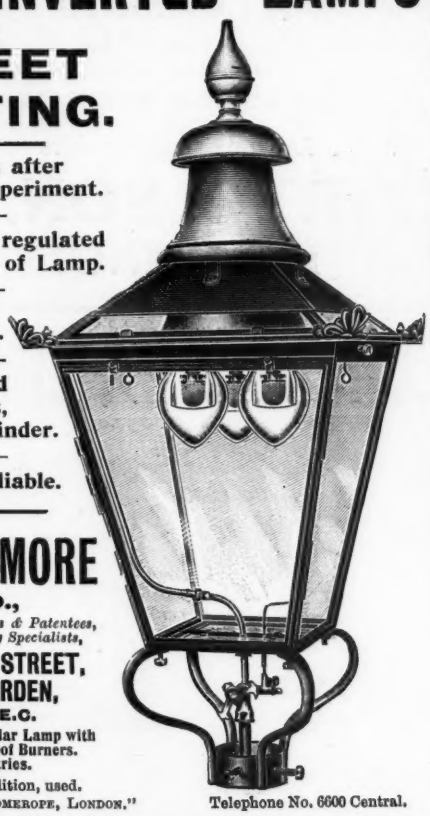

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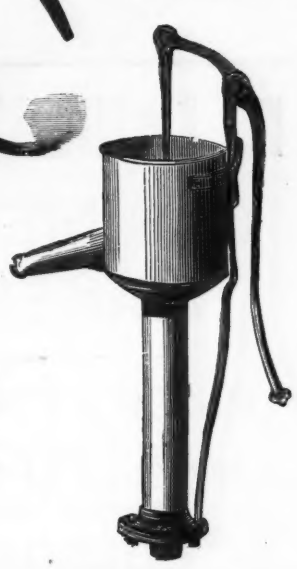

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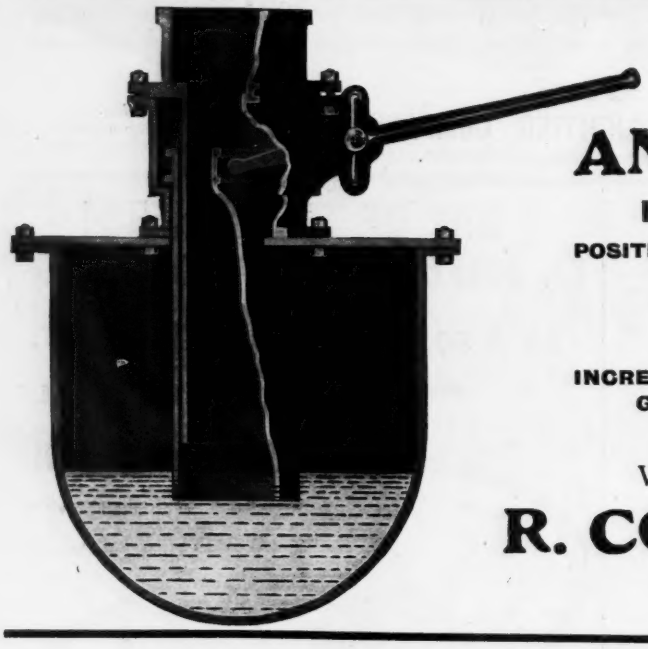

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LIGHT
Inverted Arc Lamp, Fig. 623.

Storm Proof—
For Exterior Lighting.

Welsbach-Kern
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BRITISH MADE.

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Height over all.

1-light . . .	1 ft. 8 ins.
2-light . . .	2 ft. 4 ins.
3-light . . .	2 ft. 4 ins.
4-light . . .	2 ft. 7 ins.

Width over all.

1-light . . .	1 ft. 1 in.
2-light . . .	1 ft. 5 ins.
3-light . . .	1 ft. 5 ins.
4-light . . .	1 ft. 8 ins.

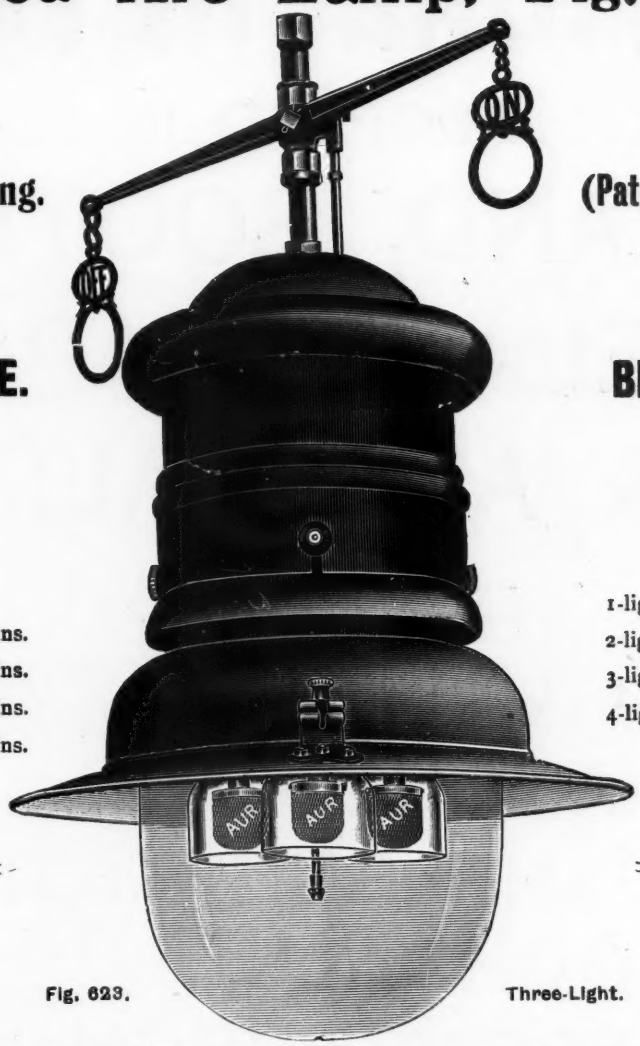

Fig. 623. Three-Light.

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1-light	4 feet	125	**30/-**	**5/-** extra.
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4-light	16 feet	550	**72/6**	**9/-** extra.

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Glass Mantle Protectors (Fig. 623) **3/4½** per dozen, or in case lots of 5 gross, **33/-** per gross.

	1-Light.	*2-Light.*	*3-Light.*	*4-Light.*
Clear Glass Globes, each	**2/3**	**5/9**	**5/9**	**9/-**
" " " In Case lots per dozen.	**19/6**	**57/9**	**57/9**	**93/-**
Case contains . .	*80*	*18*	*18*	*12*

	1-Light.	*2-Light.*	*3-Light.*	*4-Light.*
Wired Globes, extra each	**2/-**	**2/-**	**2/9**	**3/6**
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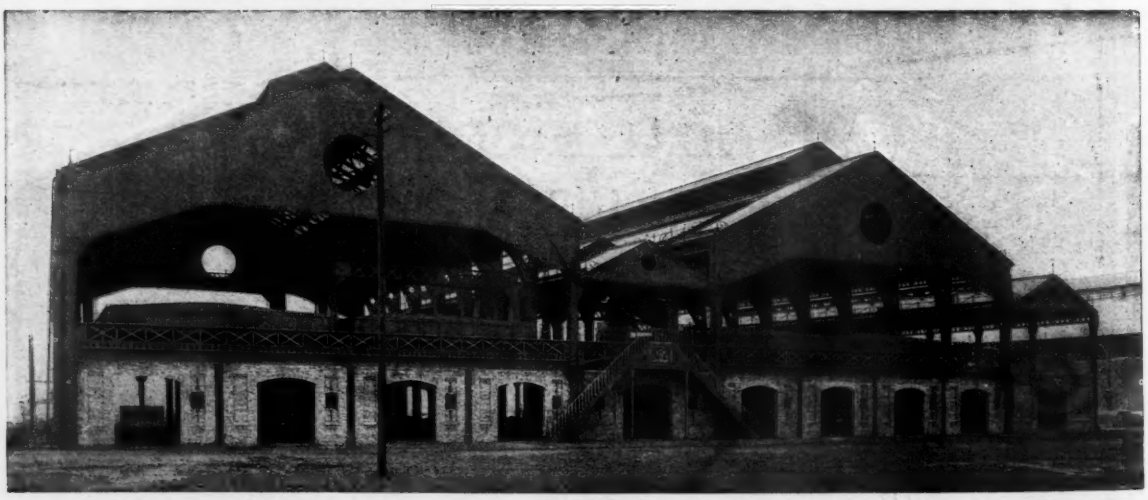

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